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Telephony

THE JOURNAL OF THE
TELEPHONE INDUSTRY
SINCE 1901

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SYNTHETIC QUARTZ

R. A. Sullivan (left), Western Electric, holds big quartz crystal grown in autoclave he is standing behind. R. A. Laudise, Bell Labs, has small crystal and earlier model autoclave which produced it. See story, p. 26.

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FLASHES AND PLUGS

A TELEPHONE IN EVERY CARTON. From the Lincoln (Neb.) Telephone & Telegraph Co.'s magazine, the *News*, comes this anecdote about employe Reah Churchill. She was attending the end station of the cafeteria line, and was about to pour a glass of milk when the telephone rang. So she put the glass to her ear and tried to pour the telephone into the milk container.

•

PRIVATE LINE PROSPECT. The Associated Press has come up with this yarn about a Roanoke, Va. woman who has a telephone and certainly uses it. It seems she set some kind of record by talking to the Roanoke Police Department for exactly seven hours and 15 minutes recently.

The police did not identify the woman by name. She called at 11:44 p.m. and reported a watch stolen. Once that complaint was disposed of, she launched into a conversation which covered practically everything, from home furnishings to politics. Busy police answered other calls, but the lady kept right on talking.

The end came shortly after 7 a.m. She began to slur her words, then came what police described as a soft bump followed by the sound of snoring.

•

TELE-PATHOLOGY. Two mind readers met on the street.
Said one to the other, "Good morning, you're fine, how am I?"

•

ROOSTING PLACE. Granite Park, Utah, police recently rescued an escaped pet falcon that had become entangled in a telephone wire and was left hanging head down, held fast by a strap tied to its feet.

Deputy Sheriff Paul Parsons was called to the scene and given the task of climbing a utility pole to "unwind" the bewildered bird.

The officer guessed the falcon had been flying too low and close to the line when both the bird and the leather strap just "twanged" around the wires.

The somewhat dizzy falcon was soon resting on a more upright perch in Deputy Parsons' chicken coop.

•

HUSBANDS' NEMESIS. From The *Expanding Circle*, magazine of The Arkansas Fuel Corp., come details of a sneaky sales approach. It seems a certain door-to-door salesman started his pitch to a housewife by saying: "I'd like to show you a little item your neighbors said you couldn't afford."

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

December 27, 1958

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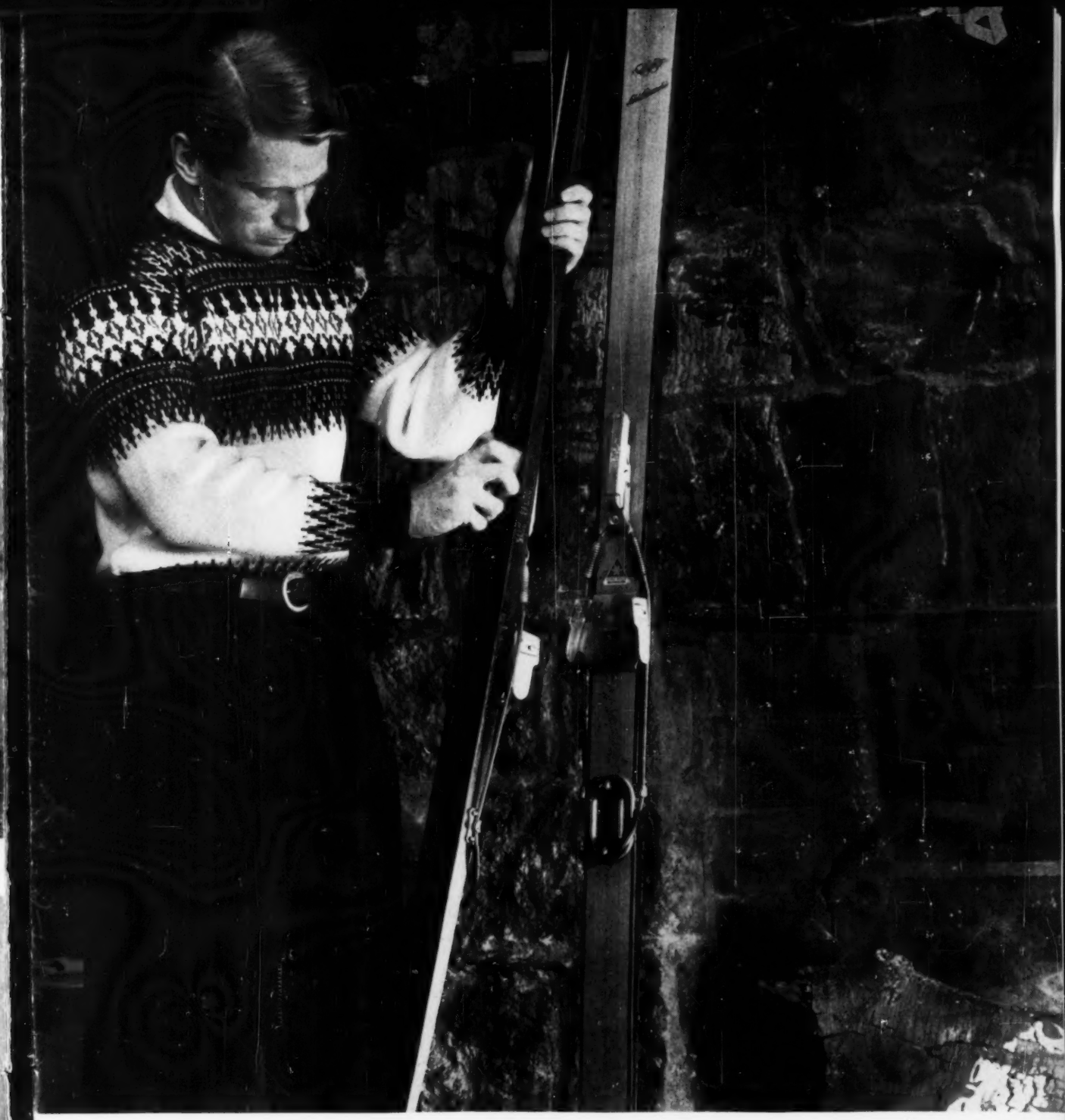

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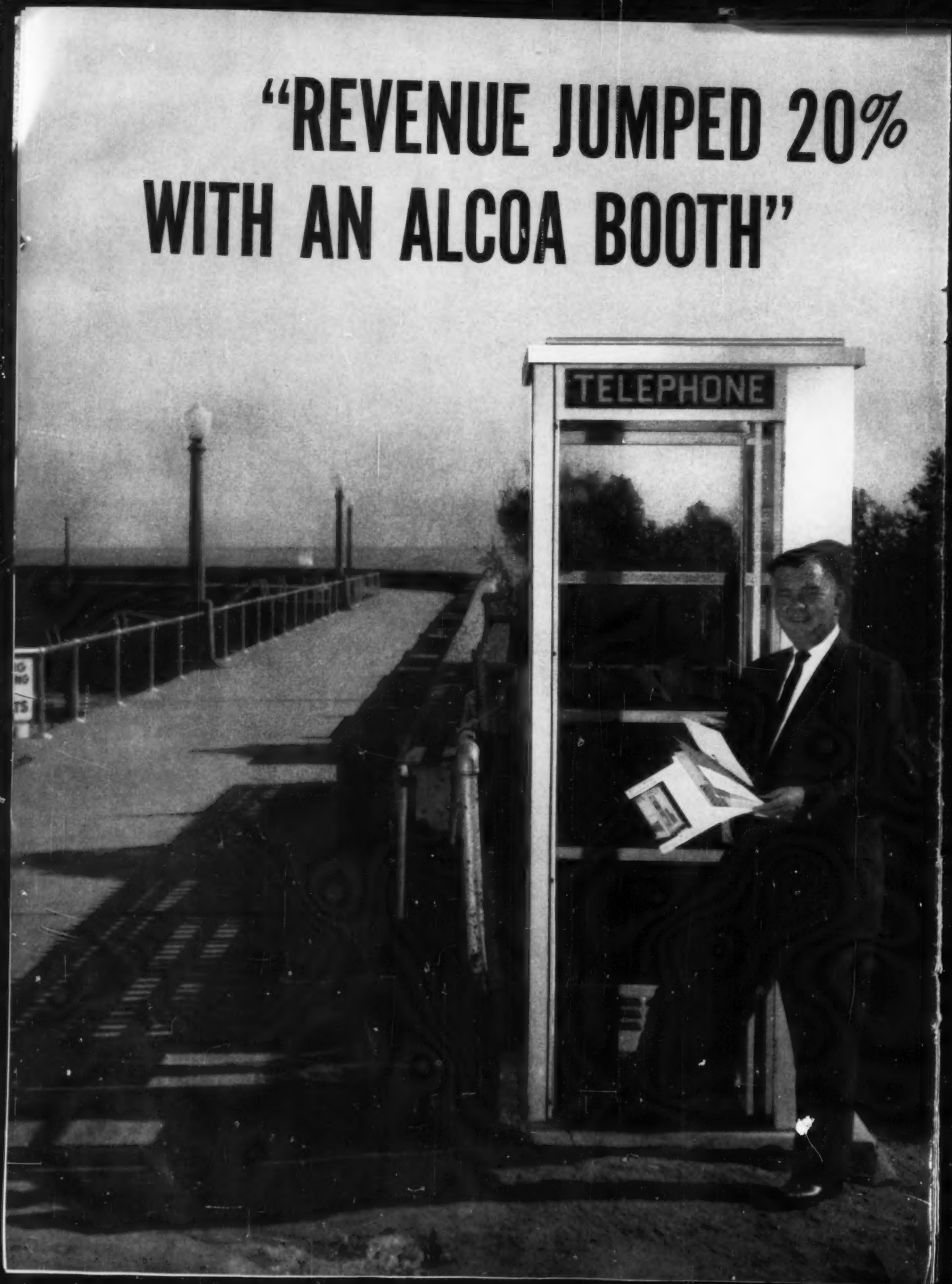
"REVENUE JUMPED 20% WITH AN ALCOA BOOTH"



Reports Mr. George M. Vernor, Santa Barbara Manager of General Telephone Company of California

Over a thousand outdoor booths of Alcoa® Aluminum are boosting revenue for the General Telephone Company of California.

Their network of attractive, well-lighted Alcoa Booths extends from Santa Barbara all the way down the coast to Laguna Beach and serves over 150 communities. Since installation began in 1956, the booths have paid their way from the first day.

"For example," says Mr. Vernor, "one Alcoa Booth located on the Santa Barbara breakwater has grossed an average of $100.78 every month for the past 13 months. This is an increase of 20 per cent over the wooden booth formerly at this breakwater location."

Increased revenue is not the only benefit General Telephone has found with Alcoa Booths. Maintenance costs have been lower: no painting is ever necessary with aluminum; cleaning is fast and simple. Erection and installation are easy: two men can assemble four booths per day; installation takes only three hours, exclusive of wiring, as reported by Mr. Vernor.

Out on the Santa Barbara breakwater, an Alcoa Booth installed by General Telephone Company of California has shown a revenue increase of 20 per cent since it replaced a wooden booth 13 months ago. Mr. George Vernor, Santa Barbara manager, points to the attractive, corrosion-resistant finish and sturdy construction that mean higher revenue and lower upkeep.

Find out how Alcoa Outdoor Booths can build revenue and goodwill in *your* area. Write for free brochure and ask your jobber to show you the Alcoa Goodwill Kit. Aluminum Company of America, 1690-Z Alcoa Building, Pittsburgh 19, Pennsylvania.

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"Alcoa Booths are easy to assemble and install," reports Mr. Vernor. "Two of our men can erect as many as four booths in one day. Installation takes only about three hours, exclusive of wiring. Easy-to-follow assembly instructions come with each booth."

"Bright, clean appearance attracts customers. Our Alcoa Booths are continuously lighted, giving a safe appearance that is undoubtedly a big factor in producing extra revenue."

ELECTRONIC SECRETARY

TWO EASY WAYS TO INCREASE

DU KANE PAGING AND ALARM SYSTEMS

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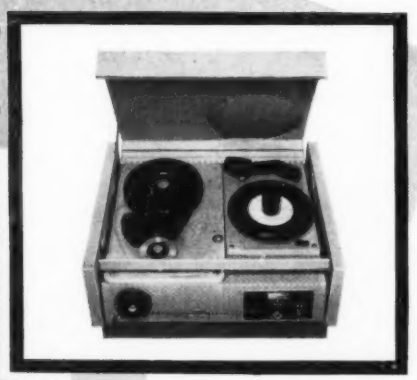

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Every business is a potential user of the Electronic Secretary. Service companies, churches, homes, doctors, lawyers, brokers, and theatres are a few. Several models are available. Write Leich for more details.

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Many telephone companies are earning substantial monthly revenue from DuKane Paging and Alarm Systems.

These systems provide electronic audio equipment for transmitting vocal messages or signals throughout a building. They are also available for making announcements, or broadcasting music.

Switchboard attendants, like those pictured here, can operate a DuKane System easily. The paging microphone is conveniently located on top of the switchboard.

Many business firms have found DuKane Paging and Alarm Systems much more flexible and efficient than a code call on a PABX. The DuKane Systems leave the telephone switching equipment free for other duties. Then, too, the DuKane unit can transmit essential information to many people, while a code call can only summon a person to a telephone.

Louden Machinery Co., Fairfield, Iowa, has a Leich PABX that is equipped with an optional paging circuit. This allows any inside telephone to dial a number which connects it with their DuKane unit.

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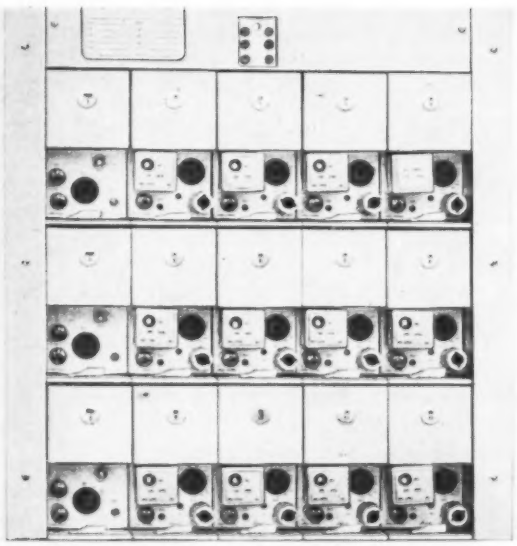
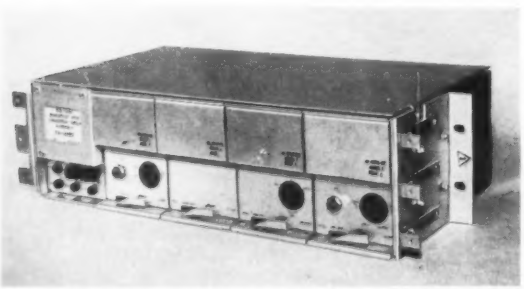


Typical Lenkurt 45-Class Basegroup Channel Bank provides channelizing and grouping equipment for 12 voice channels, yet occupies only 22¾ inches of vertical rack space. Type 45C Carrier provides for economical expansion in 4-channel groups by the simple addition of interchangeable plug-in units.



Lenkurt Basegroup Transfer-Converter permits transfer of 12-channel groups between Lenkurt 45-Class systems and Western Electric J, K, L, or CCITT conforming systems. It eliminates expense of extra channelizing equipment—permits different carrier systems to be connected in tandem without demodulating the individual carrier channels to voice frequency.

Toll business is growing at an almost incredible rate—but nothing like what can be expected as nationwide toll dialing is achieved. Are you preparing to get your full share of these mounting toll dollars?

If not, we suggest it's time to get started. Let Automatic Electric engineers help you develop your toll circuits with universally accepted Lenkurt Carrier and Microwave equipment.

Universal 45-Class Carrier

Lenkurt Carrier is the simplest, fastest, most economical way to add new circuits. Lenkurt's famous 45-class Carrier systems—for open wire, cable and microwave—offer the unique advantage of *direct interconnection at carrier frequencies*. Thus, your entire carrier network can be completely coordinated! No need for expensive back-to-back equipment to convert carrier to voice frequencies, and then back to carrier. Maintenance is simpler—distortion reduced—performance improved. Think what it means in savings to you!

New Lenkurt Microtel Type 74A

Lenkurt's new Type 74A Microtel for the 6000 mc band is the latest, most advanced microwave equipment on the market. Utilizing miniaturized plug-in components similar to those in Lenkurt 45-class Carrier equipment, it offers extreme flexibility—meets expansion needs from as few as four channels to high-density intercity systems.

Automatic Electric offers you Lenkurt Carrier and Microtel in a complete package—*engineered, furnished and installed.* If you want, we'll do the surveying—erect microwave towers—take complete responsibility for a "turn-key" installation, including on-the-job and factory training of your people. May we send you more information?

toll revenues!

open wire or cable

at carrier frequencies!

Lenkurt Microtel Type 74A takes less floor space—requires smaller antennas—uses fewer tubes—consumes less power! A single terminal can accommodate 4 to 240 channels; system can be expanded to 960 voice channels, plus 64 supervisory, remote-control or telemetering channels, *without additional antenna equipment.*

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Welch makes predictions on Washington developments of interest to telephone companies. Gives himself score of 90 per cent on the forecasts he made for the year 1958.

SINCE THESE lines must necessarily appear a few days after Christmas, this writer hopes that readers of this department will still accept his tardy season's greetings to one and all. May the New Year, 1959, be a happy and prosperous one. And, the ways things shape up at this writing, when the end of the old year is reduced almost to a matter of hours, we have good reason to expect some fine things during the next twelve months.

Following a custom which has become almost a tradition, your correspondent now approaches the annual chore of calling the shots for 1959. From the Washington observation post, some of these forecasts do not seem so good —as far as the interest of the telephone industry is concerned. But, this need not dampen the promise and hope that 1959, over-all, will be a good year and a fat year, businesswise. One thing is certain—it will be a challenging year.

Here are 10 predictions for 1959:

(1) *Acquisition Policy.* There seems to be a good possibility for some meetings between the Bell System and the United States Independent Telephone Association on the subject of a better understanding about future acquisition of Independent properties by Bell companies. The recent recommendation by two Federal Communications Commission examiners in the Menomonee Falls, Wis., case has shown the difficulty of fighting these cases out, one by one, before the FCC. The groundwork could well be laid in 1959 for a clarified policy which would apply in such cases. A high-level discussion between the American Telephone and Telegraph Co. and the USITA would go far towards maintaining unity in the telephone industry, as a whole, instead of permitting further misunderstanding to contribute to outside criticism, perhaps from political sources.

This writer hasn't the foggiest idea what the Bell and USITA might discuss as a basis for better cooperation along this line in the future. But, if it happens, it will be recalled that TELEPHONY's recent series of editorials expressed the need for such reaffirmation of industrial unity at the highest possible level.

Incidentally, the further prediction is made that the FCC, as a whole, will affirm the two examiners' opinion in the Menomonee Falls case—to the extent of approving the sale of the Independent properties in Wisconsin as being in the public interest. But, the FCC *en banc* is also likely to make important modification or clarification of the FCC examiners' opinion, which went further, in some respects, than even the FCC staff was prepared to go. If this prediction turns out, as described, we need not look for any further court appeal of the controversial case after the FCC finishes with it.

(2) *Public Mobile Radio-telephone.* The FCC will decide—probably late in 1959 — whether to allocate additional frequencies to public mobile radio service. The reason why the FCC may want to wait that long is the forthcoming international conference, next year, which will determine how much of the international radio spectrum should be divided. Until there is some over-all agreement on that line, domestic allocation claims will have to mark time. But, the Bell System has come up with an interesting proposal, and the prediction is made that the FCC will probably think well of it. The Bell System is seeking a working alliance with other electronic industries in "pressing vigorously" for allocation in the 25-890 megacycle band to serve large numbers of mobile customers in metropolitan areas.

Specifically, Bell would like to have a "solid slice" of frequencies in the 840-to-890-megacycle band, primarily for common carrier mobile service and secondarily for common carrier fixed service. This would give enough frequencies to accommodate an expanding public mobile radio service field, which the Bell experts visualize as of growing importance because of the public demand for telephone communications between vehicles in transit. But, this would also mean some shifting around. It would mean displacing some ultra-high frequency television, which is not being used very much anyhow. But, it also would permit the use of common carrier fixed service in areas where there is difficult terrain or over-water problems requiring radio circuits for land wire connections.

This program seems to fit in with an allocation plan discussed by FCC Commissioner Craven. It would mean gradual relinquishment by the telephone companies of frequencies now allocated to public mobile radio in the 35 to 43-megacycle band which could be reallocated to other services after a reasonable transitional period. It will be recalled that the FCC has already reserved for government services (doubtless defense agencies) the 890 to 940-megacycle band. Inasmuch as the Bell System will not oppose the allocation

of frequencies to other common carriers or privately-owned systems, the cooperative approach should command the sympathetic attention of the commission.

(3) *Lease-Maintenance Mobile Service.* Less promising for the Bell System is the outlook for the FCC's decision—probably in 1959—on its proposal to file tariffs to cover leased maintenance for private mobile customers on a regulated basis. This case, which has been pending with the FCC for some time, is obviously an effort to transfer such operations from a private contract basis to a regulated utility service so as to get out from under the restrictions of the 1956 consent decree, ending the government's anti-trust suit to divorce Western Electric from the Bell System. The recent decision of the FCC, reversing private radio licenses previously granted to two Connecticut customers of Southern New England Telephone Co. (discussed in this department two weeks ago), shows which way the wind is blowing. Of course, the FCC could still decide that, on a filed tariff regulated basis, such lease-maintenance operations do not come within the restrictions of the consent decree. But, this observer is not inclined to believe that arguments of the Justice Department will persuade the FCC not to approve these filings. Such a decision does not, of course, affect Independent telephone companies which could still do a lease-maintenance business either on a contract basis or on a filed tariff basis as already approved in California.

(4) *House Judiciary Committee Activity.* Another thing the Bell System is going to have to watch out for is the House Judiciary Sub-committee on Anti-trust. Headed by Representative Celler (D., N. Y.) and agitated by Representative Roosevelt (D., Cal.), this group was making noises during the past session about the failure of the Justice Department to insist on tougher terms in agreeing to end this monopoly which went against the Bell System. In 1959, reinforced by a greatly increased Democratic majority several degrees left of the position of the 85th Congress, it would not be surprising if the Celler-Roosevelt school of thought did not break out into an overt investigation. The real target, of course, would be the Justice Department, which under President Eisenhower's administration has not endeared itself to the Americans for Democratic Action (ADA) wing of the House membership, to which Celler and Roosevelt are closely aligned. But, that could put Bell in the spotlight on rehashed charges of monopoly. Maybe the recent 3-for-1 split of AT&T stock to spread the shares on a broader basis was a good idea for more than one reason.

(5) *House Legislative Oversight Activities.* The special House Sub-committee on Legislative Oversight turned in a good performance for the congressional majority in 1958 from a political standpoint. There is no doubt that the disclosures of irregularity at the FCC, the Sherman Adams Case, and similar developments played their part in the campaign. And, inasmuch as the majority ticket paid off so handsomely in the election, whether the issues injected were valid or actually effective is beside the point. The real question for the House to decide is whether the sub-committee has earned its keep and should be given another lease of life. This observer thinks the answer will be yes. But do not look for such spec-

(Please turn to page 32)

Welch Got One Wrong in 1958

In the following box score of the results on his predictions for 1958, published in this department of TELEPHONY (Dec. 28, 1957), Welch scores himself with eight right, one wrong, and one delayed verdict still pending with the FCC:

(1) **Labor Legislation.** Predicted that attempts would be made to wipe out the small exchange operators' wage exemption and to put the labor unions under strong federal regulation, but that both would fail in 1958.

Right. Both attempts made; both failed.

(2) **REA Legislation.** It was predicted that REA telephone loan appropriations would be curtailed somewhat in 1958 ("50 to 60 million dollars") and that administration efforts to boost REA interest rates would not get past the talk stage.

About right on both counts. REA actually got 67.5 million dollars for new telephone loans; no interest rate change.

(3) **Highway Relocation Laws.** A tapering off from the high 1957 level of activity in state laws to allow utilities to share federal highway funds for relocation expenses was predicted.

Right. Only one new law was passed (Virginia) as against 16 passed in 1956 and 1957.

(4) **Corporate Income Taxes.** No tax reduction for corporate income and a deficit were forecast for 1958.

Right. The budget was out of balance by about 9 billion dollars.

(5) **Federal Excise Taxes.** No change was foreseen in the 10 per cent excise tax on monthly telephone bills and long distance calls, despite industry plans for a drive to knock these taxes off the books.

Right. We still have them.

(6) **Investigation of the FCC.** The FCC was foreseen "in that familiar dart board position again in the year 1958," because of the House Sub-Committee on Legislative Oversight.

Right. It is still very much in the same position.

(7) **Mobile Radiotelephone Filings.** Prediction was made that the FCC would approve tariff filings on lease-maintenance service.

Wrong. The FCC is still stalling around on this case.

(8) **The FCC Microwave Hearings.** No prompt action was seen on the industry's effort to get more frequencies in the increasingly important microwave band.

Right. The FCC is still stalling on this one, too; but see next year's prediction on this.

(9) **Rate Cases during the New Year.** Much telephone rate case activity was foreseen as the result of continued inflation—also more pressure to shift to a value rate base.

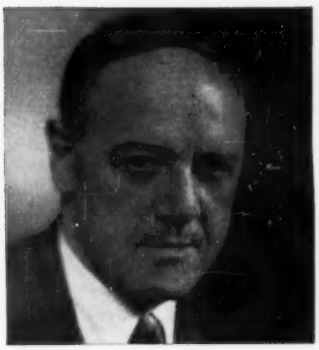
Right. Two more states, Alabama and Missouri, switched from cost to value as the result of high state court decisions.

(10) **Regulatory Legislation.** Another unsuccessful attempt by Governor Harriman of New York to repeal the current value rate base law for telephone-telegraph companies was predicted. Otherwise, not much activity foreseen.

Right. Harriman tried again—struck out. Otherwise not much activity.

today's Highlights

of finance-taxes-business trends



by Willard F. Stanley

BOND PRICES MARKING TIME—Nothing exciting happened in the new issues bond market in the 30 days ended Dec. 15. Several double "A" rated utility bond issues were offered at yields approximating 4.50 per cent, or about the level prevalent during the preceding 60 days. Industrial offerings were sparse. For the first time in several months, the Wall Street Journal's tabulation of new utility bond issues indicated current bids (at Nov. 11) yielding an average of four decimals (0.04 per cent per annum) lower than the average yield based on the offering prices of the 11 issues included in this table. While this yield-decline is meager, it is encouraging as indicating a change of trend. The difference was as great as 30 decimals the other way some 60 days previous.

The relatively static position of the new issues funded debt market seems to result from two divergent and offsetting factors: one, the relative paucity of new issues coming to market; the other, fear of further action by the Federal Reserve to prevent inflation by hardening credit and thus increasing the cost of long-term debt.

While recovery seems to have leveled out, there is still the probability of its continuance with accompanying inflation fears and consequent action to contain the recovery by tightening credit. Long-range—the pointer heads in that direction; on a shorter term scale, the outlook is for little change in the yield on new funded debt issues and other senior securities—barring an excessive resurgence of new offerings after the turn of the year.

Nothing in present conditions changes the wisdom of the course suggested last month; i.e., that new funded debt issues and other senior securities continue to be brought to market on normal schedules, with the funds being raised as needed. Offerings of common stock for new equity capital continue to be indicated by present yields and price-earnings ratios. As often previously stated, raising such equity requirements for the next year or even longer, would seem justified at prevailing price levels.

* * * *

STALEMATE IN STOCKS—The upward surge of common stock prices was reversed somewhat in the 30 days ended Dec. 16. For a while it looked as if the long-awaited reaction had at last arrived, when, some weeks ago, stocks broke abruptly 6 per cent to 7 per cent from their highs. But a rally promptly ensued, erasing most of this decline, and leaving the New York Times 50-combined-stock average at the close on Dec. 16 31 per cent above the Dec. 31, 1957 figure, as compared with 32 per cent

Mr. Stanley, formerly a utility financial executive, is now president of Corporate Services, Inc. of New York City and is well known as a financial writer. He is a member of the Controllers Institute of America and the New York Society of Security Analysts. He serves on the Finance Management Committee and the Tax Committee of the Controllers Institute (N. Y. Control). His articles are appearing once a month in TELEPHONY.

above the latter figure at Nov. 18. This denotes a decline of one per cent in this 30-day period. Compared with the 1956 close, the Times average was nearly 6 per cent higher at November 18, whereas by Dec. 16 this increase had shrunk to about 5 per cent.

* * * *

RECESSION RECOVERY—In October, the six-month mark was passed since the April low of the recession. Continuing recovery seems evidenced by most business reports, although at a slackened pace. Retailers talk of record Christmas sales. Increased automobile production seems assured and building contracts (both residential and non-residential) continue at high levels.

However, evidence of hesitancy in recent periods is also shown, such as September industrial production but one point above revised August. Retail sales, seasonally adjusted, are estimated to be down 2 per cent from August to September. But later releases show a more optimistic trend.

Limited data presently available indicates October output and sales showing only a seasonal rise, but preliminary federal government figures for November point to higher output and national income. The general view is that recent developments don't add up to a signal of renewed downturn. The big question now seems to be whether the upturn, due largely to government spending, can become self-sustaining.

Durable goods, after completing a "V" pattern of sharp decline to April followed by equally drastic recovery to August, leveled off in September to close unchanged from the previous month. Demand from industry for capital goods seems likely to turn upward next year, with emphasis on replacement and modernization designed to cut labor and other costs.

What's the "net-net" of all this? Best guess is a continued recovery at a slower rate than experienced in the upsurge of May through August—probably extending over into at least the early part of 1959.

* * * *

ASSAYING MODERN PRICE-EARNING RATIOS—A security analyst recently advanced the theory that the unusually high prevailing price-earning ratios on many listed industrial and commercial common stocks are justified. He emphasized in particular the stabilizing factor of a 52 per cent corporate federal income tax rate in slowing down both increase of or decline in net income. With this rate, corporations in effect share rises and falls in earnings about 50-50 with the federal government. This factor isn't conclusive, of course, but it is deserving of consideration.

On the other hand, tightening of profit margins in recent years operates in the other direction by creating greater leverage on both the up and down side of industrial corporate income. A favorable aspect of this latter factor is the recent indicated rise in average profit margins due to cost-cutting and other productive efficiencies, attributable largely to the need to offset loss of business in the recession.

* * * *

INCOME TAXES—An examination of the recent federal income tax amendment, which comprises a large number of "technical" changes designed to close "loopholes" or eliminate inequities to taxpayers, discloses that the subject matter is, in practically every case, of such a special nature as to be unlikely to apply to most American utilities. Special benefits to small business from the new tax law were outlined in an article by the writer appearing in Telephony, Oct. 4.

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

A NEW door-answering and intercommunication unit, designed to operate in conjunction with conventional telephone instruments, recently was placed on the market. Normally connected for outside telephone service, an optional selector switch or pushbutton on the telephone enables the subscriber to hold a two-way conversation with callers who have indicated their presence at the door by the usual door bell or knocker. This selector switch also enables the subscriber to page, and hold a two-way conversation with, persons located in various rooms within the house.

The remote speaker-microphone installed near the door or within the house may be partially or completely concealed since it functions without assistance on the part of the person at the remote location.

This device is designed to accommodate up to three remote speaker-microphone units. These can be used for door answering to cover the front, rear and side doors, or as an intercom unit with three remote units within the premises. It may also be used for combined door answering and intercom.

When used only for door answering or for intercom, the actuating telephone instruments need provide only a two-position option switch for "line" and "door" (or "intercom"). When used for combined "door answering and intercom" service, the telephone instruments must provide a selection switch with three positions: "line"; "door" and "intercom."

The equipment is placed in operation when the subscriber's main telephone, or any extension, is placed in an "off hook" condition and the option switch set in "door" or "intercom" position. This operation actuates the power supply and establishes a two-way talking circuit between the activating telephone and the remote speaker-microphone selected.

Local power for the two transistor-amplifiers and talking battery for the telephone or intercom is supplied by a power supply. The over-all power requirement is approximately 3 watts or equivalent to the operating cost of the conventional door bell transformer. A single-type transistor is used to disable the power supply when the equipment is not in use so that noise or unwanted signals will not be heard on the remote speakers.

There is little doubt that this device will serve a useful purpose in many homes. Now that extension telephones are being widely used, the speaker-microphones can be used to advantage in paging when other than the required party answers.

Moreover, it is a convenience for the housewife to be able to answer the door bell from various locations without interrupting her work to open the door.

There is also a safety factor involved when women of the household are alone at night and might hesitate to open a door in answer to the bell.

It is believed that this device will prove to be a good revenue producer providing it is properly promoted in the Independent field.

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When we are high-pressured into making a hurried decision, against our will, we are advised that the best answer is "no." It is always easier to change "no" to "yes" than "yes" to "no."

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Old soldiers are always proud of their weapons. It is obvious, however, that father's push button will not be as impressive above the mantel as grandfather's saber.

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AT&T's statisticians made a study to determine what location in the home was preferred for a new telephone extension. This survey questioned some 4,000 customers. According to their answers, almost 40 per cent want their extra telephones in bedrooms in preference to other locations.

•

It is now possible to make any object clearly visible at night when seen from behind headlights or flashlight, by using a new reflective liquid. Just brush it on; it looks like gray paint by daylight, but its reflective power is said to be 50 times brighter than white paint.

This should prove useful in protecting poles which are located near sidewalks or roads.

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Telephone men who make a hobby of repairing television receivers should have a new book titled: "How to Troubleshoot a TV Receiver." This book may be purchased from TELEPHONY for $2.50.

This new and enlarged edition of an extremely popular and practical guide to location of faults in television receivers has a soft cover and 160 pages of useful information. It explains the thinking process, as well as what to do in TV receiver repairs.

A new chapter deals with troubleshooting portable TV receivers, vertical chassis and printed circuits. Another chapter deals with troubleshooting TV picture tubes; continuing spot of light, "snivits," as well as other irksome problems.

All in all, both beginner and old-timer in TV receiver repairs will be able to derive much valuable aid from this book.

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We flew over a mountainous section of the eastern United States recently and were amazed to note the numerous microwave towers in service. Actually, a hill that did not have a tower on top had a very lonesome appearance.

Courts and Commissions

Tenn. High Court Refuses Relocation Payment Plea

The Tennessee Supreme Court ruled again on Dec. 12 that utilities, and not the state, must pay for the relocation of their facilities in the way of highway construction (TELEPHONY, Dec. 6).

The court said in a Sept. 1 decision that a 1957 act requiring the state to pay for the relocation of the facilities in the way of super, interstate highways, was unconstitutional. Southern Bell Telephone & Telegraph Co. and other utilities asked the court to reconsider the decision, but on Dec. 12 the court denied the petition to reconsider.

William Leech, former state highway commissioner, instituted the litigation which resulted in the court holding unconstitutional the 1957 act relative to utilities. The Davidson County Chancery Court upheld the measure but this decision was overturned by the supreme court.

Refuse Request to Pass on Municipal Tax in Louisiana

The Louisiana Public Service Commission on Dec. 11 turned down a proposal to permit telephone companies to assess subscribers for gross receipts tax increases (TELEPHONY, Oct. 4).

The rejection was described as a fiscal blow to the city of New Orleans, which presently has a 5 per cent gross receipts tax on Southern Bell Telephone & Telegraph Co., of which 2 per cent was imposed in 1955.

The commission vote on the issue was 2-to-1, with Commissioner Nathaniel B. Knight dissenting.

Meanwhile, Knight ended his two-year term as chairman of the commission, turning the job over to John J. McKeithen. The chairmanship is rotated among members every two years.

Southern Bell has contested legality of the New Orleans increase in the gross receipts tax in federal court. The action has tied up city revenue from that source, which, however, has been budgeted.

For 1958 the city budgeted an anticipated additional $350,000 to be derived from the increase in the gross receipts tax.

However, the company had agreed to a compromise settlement if the commission would authorize passing on the tax to subscribers.

The Louisiana Municipal Association (LMA) backed the proposal to pass on gross receipts tax increases to subscribers, following adoption of a favorable resolution by its board.

McKeithen, casting the deciding vote, had been inclined to view the proposal favorably, until opposition developed from many quarters, including dissident members of the LMA.

As presented by the mayor of New Orleans and LMA spokesmen to the commission, the proposal would have opened up a new source of potential revenue for municipalities.

Homer Bartee, Southern Bell Louisiana general manager, made the following comment on the commission's decision:

"If there is justification for levying municipal gross receipts taxes on utilities, then it appears that the burden of such taxes should properly be borne in the municipalities which would benefit from the taxes.

"The proposed tariff, if it had been approved, would have accomplished this."

Bell in Tenn. Asks Exchange, Intrastate Toll Raises

The Tennessee Public Service Commission set a Jan. 7 hearing date on the application of the Southern Bell Telephone & Telegraph Co. to increase rates for 54 Tennessee towns and to raise rates for intrastate person-to-person long distance calls.

The petition also sought:

(1) The elimination of reduced rates at night and on Sundays for person-to-person long distance calls made intrastate.

(2) A 20-cent service charge on intrastate long distance calls placed collect.

(3) A delay of from 6 p.m. to 9 p.m. on the time when reduced rates begin for station-to-station intrastate long distance calls during the week, and elimination of the special rates for these calls from 4:30 a.m. to 9 p.m. on Sunday.

(4) The reduction, in some instances, of the station-to-station rates for the first three minutes of intrastate long distance calls but an increase in charges for overtime on some calls.

(5) The allowance of six minutes instead of the present three for the initial period on station-to-station calls placed when special rates are in effect.

W. T. Bradley, Southern Bell's commerical manager in Tennessee, said the petition was designed to encourage the use of station-to-station calls.

He said the company proposed the rate increases for the 54 towns because the number of telephones in them had increased to the extent that each belonged in a higher rate group.

The increase for exchanges such as Gallatin, Dyersburg, Athens, and Morristown would be from $7.75 to $9.25 for one-party business service and from $3.40 to $3.65 for one-party residence service.

Smaller towns such as Gleason would have charges increased from $6.50 to $7.00 for one-party business service and from $2.90 to $3.15 for one-party residence service.

The proposed schedule for intrastate long distance calls would make a person-to-person call from Nashville to Memphis cost $2.20 for the first three minutes and 50 cents for each additional minute. The present rate is $1.75 for the first three minutes, 55 cents for the next three minutes, and 35 cents for each minute thereafter.

General Gets Raise For Automatic Exchanges in Ky.

The Kentucky Public Service Commission, on Dec. 15 authorized a $1,017,000 annual rate increase for General Telephone Co. of Kentucky. (TELEPHONY, June 14).

However, the commission said no manual exchange would receive a rate increase until it is converted to automatic operation and General's service is improved.

The company had asked for a 19 per cent increase, which would have given it about $1,889,000 more a year. It was

reported that the proposal to raise rates drew an unusually large number of opponents, who testified the company's service was too slow and its equipment obsolete.

General, with 47 exchanges, serves 300 communities in 30 central, southern and northeastern Kentucky counties. It told the commission the higher rates were needed for expansion and improvement and to ensure the company an adequate return on its investment.

But, the commission said the company's request was "unfair, unjust, and unreasonable." It said the 5.8 per cent return on its investment the company will make under the new rates is reasonable.

Rules Relocation Payments Violate Kansas Franchise

Kansas Attorney General John Anderson on Dec. 12 held that the state might lose federal highway aid if it reimburses the Kansas Power & Light Co. for relocating transmission facilities made necessary by interstate highway projects in Topeka.

A Kansas Highway Commission attorney asked Mr. Anderson if the state could collect 90 per cent federal money for interstate highway projects if it paid the utility for its costs in relocating its facilities from city streets.

Federal funds, Mr. Anderson replied, cannot be given the state when the payment to the utility violates the law of the state or a legal contract between the utility and the state.

He said the electric company's franchise with the city of Topeka provides the company's facilities must be relocated at its own expense when the occasion demands. The attorney general ruled that reimbursement by the state for relocation expenses would be a violation of the franchise.

Approve Stock Sale in N. C.

Central Telephone Co., Mount Airy, on Dec. 17 was authorized by the North Carolina Utilities Commission to sell 25,000 shares of its $10 par common stock to its parent company, Central Electric & Gas Co. It proposes to sell the stock at $22.50 per share to pay off "construction advances" made to it by the parent company.

Incorporate Neb. Company

The Cozad (Neb.) Telephone Co. filed articles of incorporation on Dec. 12 with authorized capitalization of $300,000. Incorporators are Neil N. Young, H. LaVon Young, M. D. Young and Cressie J. Young, all of Cozad.

Files for Toll-Free Area in Illinois

A new telephone service plan for communities in Illinois just across the river from St. Louis that would eliminate toll charges on calls between adjoining exchanges has been filed with the Illinois Commerce Commission by Southwestern Bell Telephone Co., it was announced on Dec. 12.

Involved in the plan are the exchanges of East St. Louis, the Tri-Cities, Edgemont, Collinsville, Belleville, Freeburg, Lebanon, and O'Fallon.

Toll-free calling would be available under the plan between any of these exchanges with a common boundary.

Company officials said that it would take more than a year before the plan could be put into operation if approved. Modifications and additions to switching and trunking facilities must first be made at a cost of about a half million dollars.

Local rates in some of these exchanges would be adjusted to reflect the increased size of the local calling area. These adjustments would offset the loss of revenue from eliminating charges on about 2 million toll calls a year between these Illinois exchanges.

Ohio Bell Files Pared-Down Rate Request

A pared-down schedule of rate increases, which would produce about 7.7 million dollars in additional annual revenue after taxes, was filed with the Ohio Public Utilities Commission on Dec. 7 by the Ohio Bell Telephone Co. (TELEPHONY, Nov. 15).

The new rate schedule represents a cutback of 40 per cent in the increases requested by the company last February. At that time, a group of Ohio cities affected by the increases opposed the raise and subsequently the cities and Ohio Bell reached this compromise figure.

Allow Rate Increases For 3 Kan. Companies

The Kansas Corporation Commission, it was reported on Dec. 11, allowed the Cawker City Mutual Telephone Co. to increase its rates by $4,581 annually (TELEPHONY, Sept. 20). The Cawker City company serves 364 subscribers.

Also in Kansas, the Center Township Telephone Co., Olpe, was granted a $1,583 increase for its 209 subscribers.

The Reno Telephone Association, Inc., Hutchinson, was allowed to make permanent the interim rates for dial service which have been in effect at eight of its exchanges since August 1956 (TELEPHONY, Sept. 20). The exchanges are Abbyville, Arlington, Cunningham, Langdon, Partridge, Plevna, Pretty Prairie, and Sylvia.

Southern Bell T&T Ordered To Regroup N. C. Exchanges

Southern Bell Telephone & Telegraph Co. was ordered by the North Carolina Utilities Commission on Dec. 19 to extend the base rate area of some of its exchanges and to reclassify certain exchanges into higher-paying rate groups, which it said, should be accomplished without any overall increase in its revenues (TELEPHONY, Aug. 9).

"Inequities appearing in present base rate areas create discrimination," the commission said, "and should be corrected, and inequities appearing in present group rates should be eliminated."

Regrouping of the exchanges, it said, should provide revenue "sufficient only to offset the amount of revenue which will be lost by the elimination of mileage charges resulting from the base rate area extensions."

The commission set a Jan. 14 hearing date to hear the company's proposals for extending base rate areas and regrouping 30 exchanges.

The company contended during a hearing last summer that the case does not constitute a rate case, but the commission kept it open so it "may further determine the reasonableness of the rate of return which the petitioner is realizing on its investment in property devoted to public use."

The company originally termed its proposals "about a breakeven proposition over the long-range."

The commission found that telephone growth in Southern Bell's base rate areas has been about 16 per cent since 1954 while growth outside the areas has been about 50 per cent.

"Many subscribers live within the city limits and built-up fringe areas of cities and are as much a part of the city as if they lived within the base rate area of the telephone exchange," the commission said, "yet they are paying mileage charges above the base rate charge and to a great extent are forced to accept a low grade service consisting of two, four and multi-party. The base rate areas of these exchanges should be extended."

In increasing rates by regrouping, the commission said, "an equitable difference in such rates should exist between the service groups because of the greater value of service where a larger number of telephones are available for calling.

Southern Bell had sought to extend base rate areas of 53 of its 82 ex-

changes and to regroup 30 exchanges immediately.

The commission said that "in determining a group into which an exchange may belong, a tolerance of 5 per cent, either over or under the number which may be established as the breaking point between groups, should be used and applied."

Southern Bell has contended that a $1,438,293 increase in rates under its proposals would be nearly offset by a loss of almost one million dollars through reduction or elimination of mileage tolls. Moreover, it was reported, about $400,000 would be required to upgrade service after base rate area extensions.

West Coast Granted Half Amount Requested in Ore.

Oregon's Public Utility Commissioner, Howard Morgan, on Dec. 12 approved $440,038.40 of the $834,660 in rate increases requested by West Coast Telephone Co., Everett, Wash. (TELEPHONY, Mar. 29).

This increase in gross income will produce $193,284.63 in additional net income, and a 6.15 per cent return on a plant original cost (less depreciation and other adjustments plus working capital) of $20,268,994.66.

The commissioner, in his order, noted complaints of subscribers relating to substandard service. The commissioner observed in regard to complaints from the company's Beaverton exchange:

"Many of the complaints received from Beaverton district subscribers undoubtedly have been motivated by the large differential in rates between the company's exchanges and the Portland exchange of Pacific Telephone & Telegraph Co. (Bell System).

"This is a part of a larger and extremely complex problem upon which subsequent proceedings by the commissioner unquestionably will be necessary.

"The information obtained in these hearings will be of material value to the commissioner in his future efforts to resolve the problem of differentials in rates between exchanges lying within a single metropolitan area."

Due to what the commissioner found to be substandard service conditions, the company's rate of return was "fixed in the lower ranges of the zone of reasonableness."

The commissioner indicated that when the company has instituted the program of improvements he recommended, then conditions may be bettered sufficiently to warrant a rate of return higher in the zone of reasonableness.

On its behalf, West Coast Telephone Co. went on record on Dec. 16 as believing that the commissioner's order "tended to mislead the public, both as to the quality of service and need for additional revenue."

L. Gray Beck, West Coast company vice president and general manager, said that the order, in certain places, even contradicted an independent study of company service which Commissioner Morgan himself had ordered conducted.

Morgan and the Chicago consulting firm of Sloan, Cook & Lowe signed a contract June 6, 1958 for the study of West Coast service in Oregon. Mr. Beck disclosed that the report which the firm delivered to Morgan on Sept. 25 set forth four major conclusions:

(1) West Coast Telephone Co. is currently rendering an adequate service comparable to that offered on the average by the best operating companies in the industry.

(2) It has met and reasonably fulfilled an abnormally large demand for service in the areas it serves.

(3) With minor exceptions, as pointed out in the report, the company is providing sufficient equipment of a high grade and is operating it to good advantage.

(4) Likewise, the company has developed and instituted routines and procedures which are in accord with good operating practices.

"Those words come right out of the report of a competent Illinois engineering firm retained by the PUC (commissioner) to make an objective study of our service," Mr. Beck said. "We are unable to explain the commissioner's disregard of the main findings of this authoritative investigation—a disregard that puts the company out on a limb where it does not belong."

The company sought a rate schedule equivalent to a rate of return of 6.85 to 7 per cent to enable it to pay a reasonable dividend, make an adequate accumulation for surplus and provide a sound base for anticipated growth.

High Court Refuses Review Of Hearing Decision in Fla.

The Florida Supreme Court on Dec. 3 declined to review a district court order denying the city of Tallahassee's motion to prohibit Circuit Judge Hugh Taylor from hearing a Southeastern Telephone Co. suit to permit it to charge higher temporary rates under bond (TELEPHONY, Aug. 23).

Judge Taylor had ruled that the Florida Railroad & Public Utilities Commission could not rescind an order granting temporary rate increases which were allowed pending final determination of the Southeastern company's request.

The district court reversed that ruling and the Southeastern company has filed notice of intention to appeal from the district court ruling.

If the supreme court had ruled that Circuit Judge Taylor lacked jurisdiction in the first place, the Southeastern company could not have appealed the district court's decision.

The main question of whether the rates will be increased permanently is still pending before the commission.

The litigation still remaining affects only Southeastern's right to charge temporarily higher rates under bond.

The temporarily increased charges still are being collected under Judge Taylor's order which remains in effect pending appeals through the higher courts.

N. Y. PSC Chairman Resigns; Appoint New Member

Benjamin F. Feinberg on Dec. 17 resigned as chairman of the New York Public Service Commission because of ill health.

Spencer B. Eddy, of Saratoga, deputy chairman under Mr. Feinberg, will continue to serve as acting chairman as he has been doing since November, Governor Averell Harriman announced.

Governor Harriman appointed James M. Landis, of Rye, as a member of the commission to fill out Mr. Feinberg's term which runs to next February.

Mr. Landis, a Democrat and former dean of Harvard Law School, once headed an investigation of harness racing in New York. He is a former chairman of the Securities & Exchange Commission and a former member of the Federal Trade Commission and the Civil Aeronautics Board.

Mr. Feinberg has been seriously ill since November, having been stricken while attending the National Association of Railroad & Utilities Commissioners (NARUC) convention in Phoenix. He is currently in the Royal Victoria Hospital, Montreal.

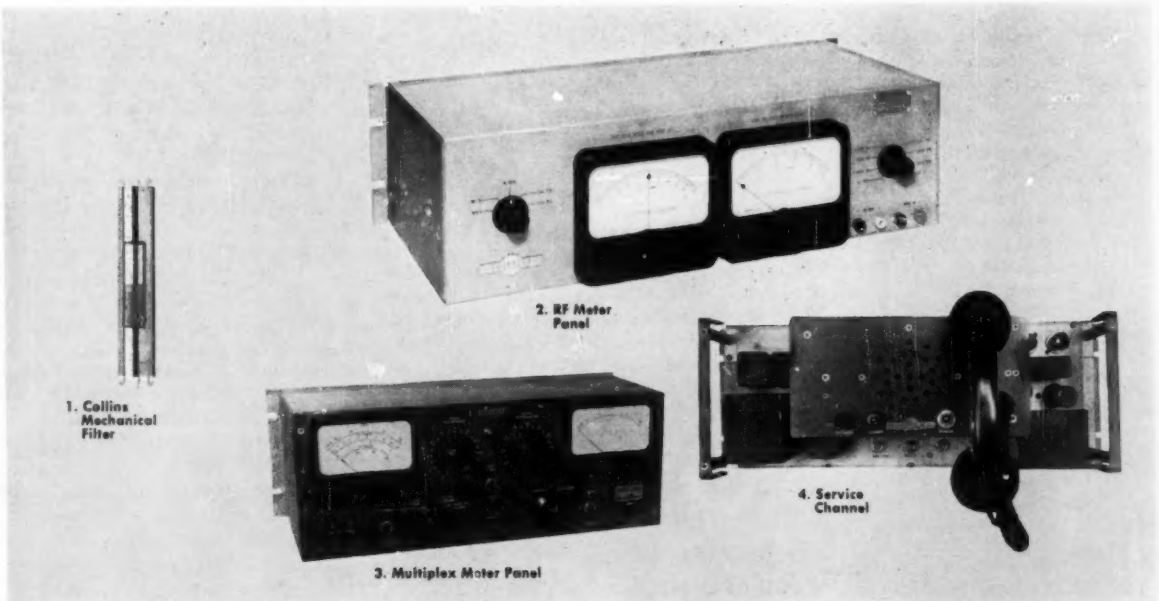
A Republican from Plattsburg, Mr. Feinberg had been appointed commission chairman in 1949. He had been majority leader and president pro tem of the New York senate for the last six of his 18 years in service in that legislative body.

Revise Ida. Mutual's Status

The Carey Telephone Co., which since 1911 has operated as a mutual company, on Dec. 9 was brought under the jurisdiction of the Idaho Public Utilities Commission which issued it a certificate of convenience and necessity, authorizing it to serve its 160 subscribers. The company expects to convert its exchange to automatic operation by next July.

Here are some Collins Microwave features that can cut your maintenance costs

The electrical and mechanical design of Collins Microwave systems insures low maintenance costs and reduces circuit outages to the absolute minimum



1. Single sideband suppressed carrier multiplexing is simplified and made more economical by the use of Collins' Mechanical Filter. The steep skirt attenuation prevents co-channel crosstalk. The filter is a small, permanently tuned, hermetically sealed unit. Deterioration of system performance by coil aging, humidity, and other detrimental effects is eliminated.

2. Metering and control facilities for preventative and corrective maintenance are built into the equipment. On the front of the RF rack is a self-contained meter panel to check transmitter and receiver oscillator repeller and beam currents and voltages, discriminator balance, received signal levels, mixer crystal current (local oscillator frequency), transmitter frequency reference, transmitter power and relative antenna power. In addition the panel may be used as a voltmeter or milliammeter, using external test leads, to measure at test points throughout the RF, coupling, and multiplex equipment.

3. A test panel for the multiplex equipment provides metering facilities for level measuring and setting, and general purpose audio measurements.

4. The Collins Microwave service channel provides simultaneous voice transmission and reception, with signaling, among all stations in a system on a party line basis. Direct modulation of the microwave equipment is employed without using the carrier facilities.

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WE, Bell Labs Develop Method For Synthesizing Quartz

ANOTHER break-through in the creating of synthetic materials which compares with the production of synthetic rubber, nylon, and rayon, was announced recently.

Details of pilot plant production of synthetic quartz crystals for telephone communication purposes were revealed in a paper given at the American Institute of Chemical Engineers' meeting in Cincinnati. The paper described the production facilities that are believed to be the most advanced type to date and are now growing large crystals in limited quantities at Western Electric's Merrimack Valley Works in North Andover, Mass. It was presented by R. A. Sullivan of Western Electric, who supervised the pilot plant activities, and R. A. Laudise, one of the Bell Telephone Laboratories scientists, who brought the laboratories hydrothermal process to the pilot plant stage.

The Bell System, a large user of quartz for filters, oscillators, and frequency standards, has been interested in synthetic quartz processes for some time. This interest has resulted from the increasing difficulty in obtaining large crystals of natural quartz, and from the generally unstable market conditions.

Synthetic quartz is reported to provide a number of advantages over natural quartz in addition to its availability in any quantity and size. Seeds can be cut to provide grown crystals which can be sawed in the most efficient manner. Also, synthetic quartz has natural crystal faces which allow easier orientation of the stock for cutting into crystal units. It is said to have none of the foreign inclusions which usually occur in natural quartz, and it can be produced without either optical or electrical twinning. It is estimated that the greater yield resulting from these improvements is at present at least two and one-half times that of natural quartz.

The hydrothermal process has been widely investigated on a laboratory scale for several years, and quartz crystals about ¾ inch square by 1½ inch long, and larger, have been grown at Bell Laboratories. The processing equipment has been scaled up for pilot plant investigation and quartz crystals up to 2 to 3 inches in each cross section dimension, and 5 to 6 inches long, have been grown in this equipment. Operations have not been directed toward growing the biggest possible crystals, but toward determining the optimum processing parameters.

In the hydrothermal process, a long narrow autoclave mounted vertically is filled with an alkaline solution, usually sodium hydroxide. Small pieces of readily available natural quartz are then placed in the bottom of the vessel to provide the nutrient.

Future production, it is predicted, will utilize even less costly and more readily available material, such as high quality sand, as the nutrient. Seed plates cut from either natural quartz, or previously grown synthetic crystals, are hung from a rack in the upper section of the vessel. After sealing, the autoclave is heated to the required temperature, and maintained under a constant temperature differential from bottom to top for the requisite processing time. This period has varied from a week to several weeks, depending on the experiment being performed.

Economical growth rate considerably in excess of 60 thousandths of an inch per day has been achieved. Since growth occurs primarily in one dimension, flat seed plates are used, which effectively become thicker but change little in other dimensions. The rate of growth varies with each of a number of conditions, including the temperature differential between nutrient and seed plate area, the alkalinity of the solution, the temperature, and percent fill (or pressure).

Operation of the hydrothermal process depends on the maintenance of a temperature differential between the nutrient area and the seed plate area. The nutrient dissolves in the hotter lower region and is carried by convection currents to the cooler upper region. The lower temperature here leads to a supersaturated condition in the nutrient solution, which causes the dissolved quartz to redeposit onto the seed plates in single crystal form.

Americans Are Out-Talked, AT&T Survey Finds

Americans have more than half of the telephones in the world. But they're being out-talked by people in several other spots on the globe.

The 1958 edition of "The World's Telephones," released on Dec. 18 by American Telephone & Telegraph Co., shows the United States averaged 460 conversations per person last year—trailing the Canadian average of 497 and the Swedish conversation rate of 491.

The statistics indicate it's the inhabitants of the colder climes that make the most use of their telephones. Geographically, the most talkative telephone area in 1957 was Alaska with an average of 581 conversations per person. Little Iceland also ranked high, averaging 452 per person.

An exception was Hawaii. The island territory with the travel-folder weather reported 522 conversations per person. No doubt this includes calls by talkative tourists from cold countries.

The world in general—including savages who never even heard of a telephone—averaged 56 telephone conversations per person. This compares with 51 for the preceding year.

The telephone survey records a total of 117,800,000 telephones in service in the world on Jan. 1, 1958, a gain of close to 8 million over the previous year.

The United States, with 63,621,000 telephones, led the list of countries having the largest systems. Second was the United Kingdom with 7,354,000. Canada reported 4,816,118; the German Federal Republic (West Germany) 4,731,945; Japan 3,886,327; and the U.S.S.R. 3,558,000.

The Russian telephone statistics were the first to be reported from that country since 1936.

The new edition of "The World's Telephones," based on statistics gathered during the past year from some 200 countries, also shows:

The United States had 37 telephones per 100 population as of Jan. 1, compared with only four for the entire world. Other countries with high developments were Sweden (33), Canada (29), and Switzerland (27). The United Kingdom had about 14 for every 100 persons, West Germany 9, Japan 4, and the U.S.S.R. 2.

Two cities—New York (4,204,007 telephones) and Chicago (1,800,103)—had as many telephones as there were in the huge continent of Asia, where more than half of the world's people live. New York City alone had more than there were in France. Among foreign cities, London with 2,149,000 telephones had the largest number.

Washington, D. C., with 70 per 100 persons had the greatest telephone saturation for metropolitan areas. Stockholm, with 57, occupied first place in this respect among cities outside the United States. Moscow, with 454,000 telephones, had 9 per 100 population.

The company pointed out that all the figures relate to the beginning of 1958 since it takes almost a year to gather the information.

TROUBLE CLEARING

Let's Take a Look at Work of Pioneers

By L. N. MARTIN

AT TIMES it is good to lay aside the problems of the present, and plans for the future, to take a look at the past. History is considered a valuable study in all schools and colleges. Telephone men should take time once in a while to read about the work of the pioneers in our business, how they solved their problems, and, yes, the mistakes they made.

Early telephone men found much prepared for them by the much older telegraph business. Telegraph companies had learned how to build open wire outside plant. Poles, crossarms, glass insulators, iron and copper line wire were on the market. Some of the insulated wires available could be used for the time being, but wire made especially for telephone uses was soon developed.

Some mistakes were made by following telegraph practices too closely without giving sufficient thought to the new problems which the infant telephone industry imposed. All telegraph lines were grounded (one wire). It was only natural that early telephone men used grounded lines. The first experimental long distance line (about 30 miles) was a grounded circuit borrowed from a telegraph company. It was many years before telephone men learned the superiority of metallic circuits and many more years before this knowledge was put into general practice. Today, we still see grounded telephone lines in some rural areas.

Old Idea of Metallic

When the advantages of metallic circuits became generally known, some telephone man (we do not know who) had a bright idea. He would make his lines metallic without the expense of doubling his wire plant. He strung a single large gauge wire on each lead. These wires were connected together at the junction poles and finally connected to one large copper wire which entered the central office. This was called a "common return wire."

Telephones were connected by metallic drops. One side of the drop was connected to the apropriate line wire and the other to the common return wire. At the central office, the tips of all switchboard lines were bunched and connected to the common return wire. Thus, the current was conducted by metal all the way and, in the mind of the inventor, this constituted a "metallic circuit."

PART 68. The preceding installment in this series appeared in the September 27 issue.

Of course, it did not work. The noise and cross-talk were worse than before, The unbalanced common return wire carried an electrical disturbance from anywhere in town to *all* the telephones. A bad joint in the return wire would cause an actual ringing and talking cross between all the telephones beyond the trouble, and a bad joint near the central office would cross up the whole exchange. Other telephone men tried this scheme without waiting to see how the first man came out, because we saw several of these "common return" plants (and worked in one of them) before the idea was abandoned.

Didn't Understand Balance

These telephone men did not understand that the advantages of a metallic circuit are not due to the use of metal conductors throughout, but to the *balance* between the two sides of the circuit. To obtain a good balance, both sides of the line must have the same resistance, inductance, and capacitance. Also the exposure of each side of the line must be the same. The latter condition is obtained by transposing open wire and twisting cable pairs.

The first telegraph line connected two points, such as New York—Philadelphia. However the telegraph soon came to be used for railroad train dispatching which required an instrument in each station as well as in the dispatcher's office. All of these instruments were on one line. There was usually a second wire which was used for commercial business, but which could be interchanged with the dispatcher's wire in case of trouble. The single wire of each circuit followed the right-of-way from station to station; going into the station, through the relay and key in series, then out again, and on to the next station. Each end of the line was connected to ground through a battery. The two batteries were poled so that they would aid each other.

The very first telephone lines also connected two points. A common use was to connect the office and residence of a business or professional man, or to connect two business offices. We would now call this a private line. However, the switchboard was soon invented and the telephone industry developed as a local exchange business. Each subscriber had an individual line to the switchboard and he could be connected to any other subscriber in the same exchange. Intercity trunks connected exchanges which were not more than about 50 miles apart, but long distance service, as we know it today, had to wait many years for the invention of the loading coil and the repeater. Party lines were unknown, except that a business or professional man sometimes asked that his office and residence lines be permanently tied together.

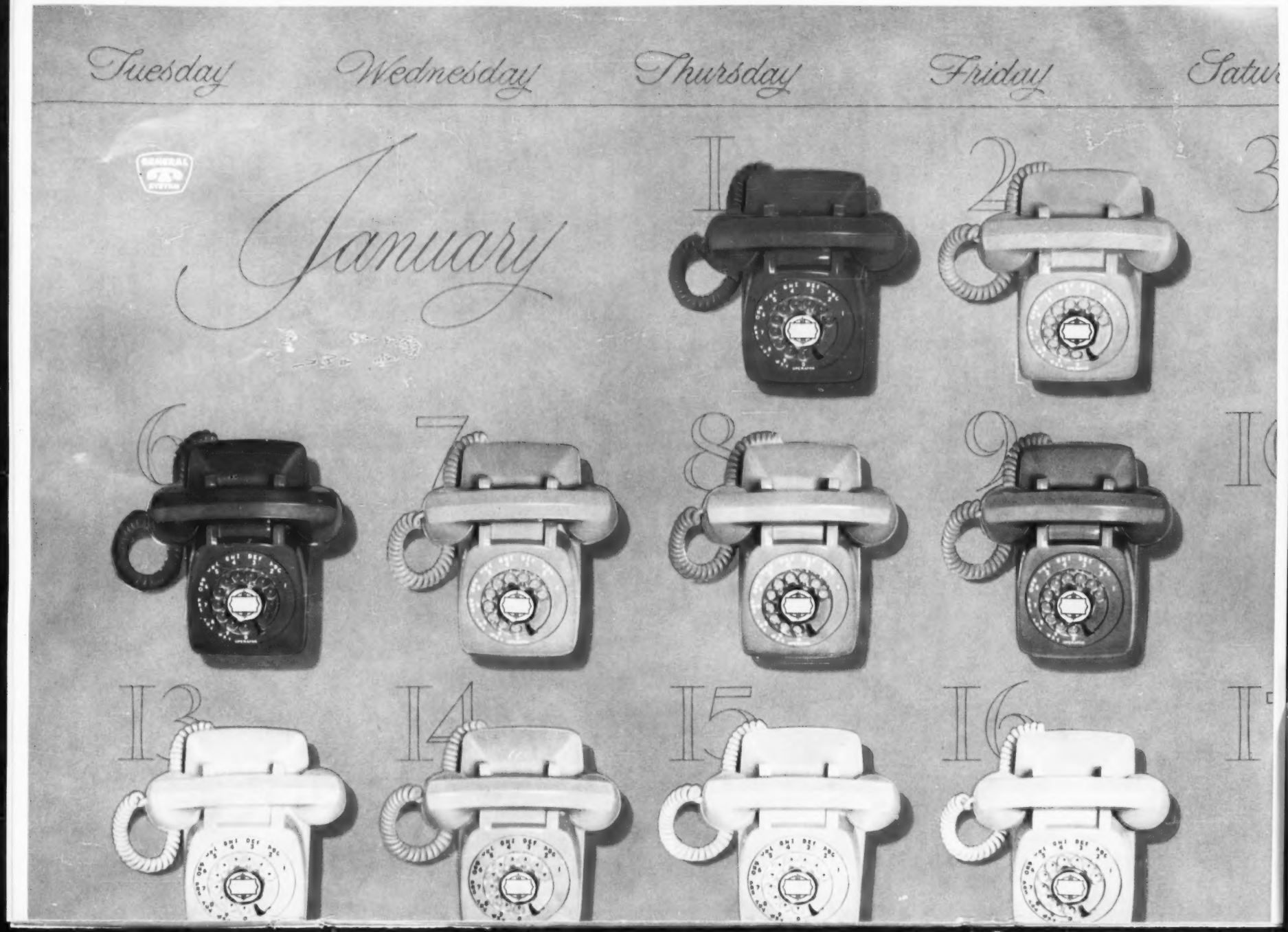
Rural "Series" Lines

When the demand arose for service in rural areas it became evident that some kind of a multi-party line would be required. What could be more natural than for those pioneer telephone men to think of those long series telegraph lines that followed the railroad and had an instrument in each station? So the first rural telephone lines were *series* lines.

The single wire left the central office, went through the first telephone, back out to the pole, on down the road to the next telephone, through it, and so on. After going through the last telephone the wire was connected to a ground rod. The tip side of the switchboard drop was, of course, grounded. In one case that we saw, the line took a circular route around the country and returned to the central office, thus making a metallic circuit (of sorts).

A modern telephone man will ask: "How in the world could they talk

(Please turn to page 30)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10 reasons why

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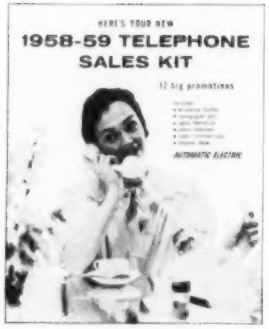

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through all those ringers?" He knows that the voice is barely audible through an 1,800-ohm ringer.

The "series telephone" differed in several ways from the magneto sets in use today. The talking circuit was the same but the switchhook had a back contact which opened the signaling circuit when the receiver was removed from the hook. The ringer and generator were in series and the ringer had a resistance of only 80 ohms. The generator was built for high voltage rather than high current and the generator shaft switch was arranged to short out the generator rather than open it when the crank was not being turned. The person using the line talked through all of the ringers, except the one in his own telephone, *in series*. If the line had 20 subscribers (a common loading) he talked through 19 ringers at 80 ohms each, which would be equivalent to one 1,520-ohm ringer.

Transmission Very Poor

Why wasn't the transmission poor? *It was poor.* It was very poor. We remember talking over some of those lines. However, in those days the db meter had not been invented. The series party line idea was soon abandoned due to its poor transmission. We remember when advertisements began to appear in TELEPHONY, extolling the advantages of the new "bridging" party line telephone with its powerful six-bar generator and 2,500-ohm ringer.

We may not have heard the last of the series telephone. Only a few years ago we were called in on a case of trouble which involved a "service," or "switching," line where the telephones and the line were owned by the subscribers and the telephone company furnished the switching service and a line out of the city limits. The subscribers on this line were not getting their rings and the transmission was very poor. As usual, the subscribers blamed the company and the company blamed the subscribers. We were called upon to settle the dispute.

We held a meeting with the subscribers and soon found that one of them had no complaint. He got good rings and his transmission was good. Had he recently replaced his telephone? Yes, he had a new (second hand) telephone which he had obtained at a bargain. He thought that the other people on the line should also get new telephones. We asked to see this telephone before we did anything else.

Yes, we were on the right track. Someone had sold him a museum piece, an old-time series telephone. Its 80-ohm ringer (bridged across the line) acted as a heavy short to both the ringing and talking currents. However, *he* received good rings because his 80-ohm ringer took nearly all of the ringing current. (The other ringers were 2,500 ohm.) His transmission was also good, because when he took his receiver off, his low wound ringer was opened at the back contact of his switchhook and hence was no longer bridged across the line.

The cause of the trouble on that line was now obvious, but there remained the job of convincing that somewhat stubborn subscriber that he must give up the telephone, of which he was very proud, and buy another instrument. We will leave that lengthy argument to the imagination of the reader.

Today's Laboratories Asset

The mistakes of pioneer telephone men which we have mentioned have one thing in common. A new idea was tried out *at the expense of the service* and of the owner's pocketbook. That was the only way it could be done at that time. There were no telephone laboratories.

Today, there are many laboratories working on telephone improvements and developments. All major manufacturers of telephone equipment have their own laboratories. A new idea originated by a small telephone company, or by a telephone employe, should be submitted to one of these laboratories for testing and evaluation before being given a field trial at the expense of the public service. If a man originates a new and valuable idea why should he not have it patented and reap all the profit himself?

There are several good reasons why this is not practicable at the present time. The individual telephone employe should remember that the courts have held that where a man perfects an invention on his employer's time or even on his own time when the idea originated from his work and experience in his employer's business, the invention belongs to the employer. Even if he got over that hurdle he would have to have the capital to develop his invention to the point where he could market it. He would probably have to give up a steady job for the *very* uncertain prospect of making a large profit from his invention.

The day of the individual inventor is about over. New ideas are now perfected by the cooperative effort of a large group of men, usually a laboratory team.

Transistor Development

Probably, the most valuable addition to the telephone art in recent years is the transistor. Who invented it? The word "transistor" does not bring to mind the name of some famous inventor like Bell, Edison, or Marconi. We have read the name of the man in the Bell laboratories who first started the project but we cannot recall it now. He did not work alone. The cooperation of many men with a variety of knowledges and skills was required to bring the transistor to its present state of perfection and the work is still going on. *The transistor was invented by an institution*—the Bell laboratories. (It should be noted that the Bell companies do not have a monopoly on the transistor. It can be made and used by any Independent telephone company or in any other field where it is useful.)

No one man can now have the ability to perfect a major invention. Also one man working alone would be too slow. He might spend many years perfecting something that is needed *now*.

How about the personal reward? We believe that a man who can produce valuable new ideas has a better chance of profit when working through a large organization than he did under the old system of going it alone. His work will be recognized and he will be offered a much better job in some research laboratory. All of the men in these laboratories do not have high college degrees. These laboratories know that "gold is where you find it" and that valuable ideas often come from artisans with little education.

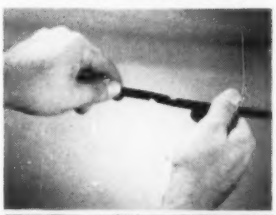
Let us not condemn our telephone ancestors or ridicule their mistakes. They did a wonderful job with what they had. One of the handicaps of the infant telephone business that is not generally recognized is the fact that it was the first to make extensive use of alternating currents. The telegraph business used direct current. All power and light at that time was dc. While the transient effects of inductance and capacitance in a direct current circuit were well known, the effect of these forces on a continuously alternating current was little understood.

In their efforts to extend the length of long distance lines, early telephone men thought only of resistance and the simple Ohms law. They used larger and larger copper wire, but they still could not talk over more than about 100 miles of line. It was Pupin (who was not a telephone man) who discovered that *capacitance* and not resistance was causing the trouble and that *inductance*, in the proper amount and in the proper place, was an antedote for capacitance. But, that will be saved for another story.

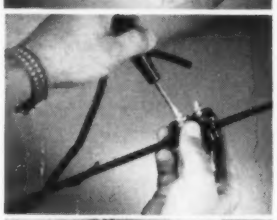
Telephone men should be thankful that they live and work in this day of scientific knowledge, specialization, and cooperative effort. An age in which they can obtain help on any problem from some man or some institution that is especially qualified to solve it.

Proven Products

Easy installation of the SUPERIOR TERMINAL

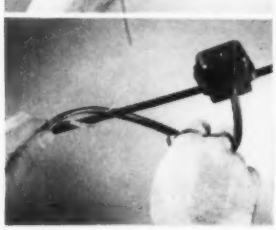


Skin line wire insulation.



Fix terminal in place on line wire.

Connect drop wire.



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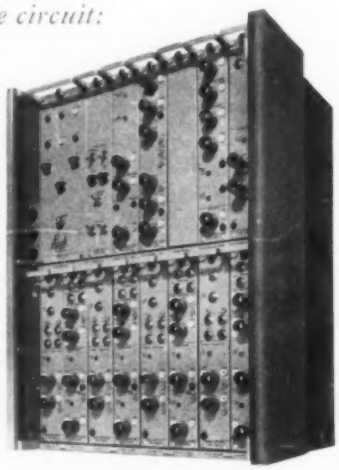

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IN THE NATION'S CAPITAL

Continued from page 18

tacular operations in 1959, compared with 1958.

Other federal commissions beside the FCC will be given the spot-light treatment. The end result in terms of legislation probably will not amount to very much. The sub-committee still has to deal with the very tender question of congressmen as well as others who try to influence regulatory decisions. Some new law and some new canons of ethics on the subject of proper procedures are in prospect.

(6) *Labor Legislation.* After surprisingly successful efforts during the past four Congresses to fight off amendments to the Wage-Hour Law, this writer believes that the luck of the USITA will run out in 1959. The united forces of the AFL-CIO will undoubtedly press for an amendment to boost the minimum wage from $1.00 to $1.25, and to broaden coverage of the Fair Labor Standards Act. Included in this broadened coverage will undoubtedly be the perennial proposal of the Communications Workers of America (CWA) to wipe out the exemption which now prevails for wages of telephone operators at smaller exchanges (of less than 750 stations), but the USITA can be depended on to put up a good battle and it could go the other way.

In the same general category of legislation will be efforts to regulate labor union practices, such as the use of welfare funds and other abuses brought out by the McClellan committee. The prediction is made that a law will be passed but it will be a milk toast proposition. Along lines proposed during the last session by Senator Kennedy (D., Mass.). The country will have to wait for another Congress to put a real regulatory control on labor unions similar to that now imposed on business employers.

(7) *REA Rural Telephone Loan Program.* President Eisenhower will propose an increase in the present REA interest rate of 2 per cent, and also suggest that REA borrowers be encouraged to look elsewhere for their financing. No such legislation will pass Congress in 1959. President Eisenhower will probably try to cut down on REA lending authority, but the new Congress will continue at the present level of appropriations, which would mean about 70 million dollars for rural telephone loans in the coming fiscal year. On the other hand, probable attempt in Congress to free REA from Agriculture Department control, or to

prevent private companies from buying out REA co-ops will not succeed.

(8) *Rate Case Activity.* In 1959 there will be no letup in rate case activity, but we can expect the state commissions to work out their problems without much interference from state legislatures. This prediction is made with full knowledge that 1959 will be one of the "big years," in which 45 out of the 49 state legislatures meet in regular session. The same pressures of inflation and controversy over valuation and return standards will continue unabated. Perhaps one or two more states may swing over from the cost to the value rate base column by virtue of court decrees. But this writer believes that state legislatures will not be disposed to change the statutory ground rules. In New York, for example, Governor Harriman will no longer be around to urge his perennial bill to change the telephone company rate base law in that state from fair value to cost.

(9) *Highway Relocation.* Court litigation will be more of a feature than state legislation in 1959 with respect to state laws to reimburse utilities for the expense of relocation due to highway construction. Seventeen of these laws are now on the statute books, but in five states they have been called into question. They have been knocked out in two states—New Mexico and Tennessee—and tentatively approved by an attorney general's opinion in Florida. In three other states, Texas, Montana and North Dakota, they are still being litigated. There have been favorable decisions in New Hampshire and Minnesota.

The prediction is made that there will be more litigation along these lines. Until a pattern is more clearly established, there will be less such legislation passed by those states which have not as yet enacted highway relocation laws. Perhaps one or two states may come into the fold, but not more than that.

(10) *Accelerated Depreciation.* In 1959 we may see more and more public utility companies switching from accelerated depreciation to the old straight-line method for tax purposes. The reason is that quite a few state commissions seem to be lining up with such states as Pennsylvania and Wisconsin in giving public utilities absolutely no benefit if they seek to use accelerated depreciation provisions of the 1954 Internal Revenue Act (Sections 167 and 168).

Congress doubtless intended that such deductible allowances should benefit all industry so as to encourage plant expansion and a greater velocity of business and employment. But, where state commissions refuse to make any allowance as operating expenses, except for income taxes actually paid, obviously the accelerated depreciation method gives the utility companies, as such, no benefit whatever, and might even do them some harm by temporarily keeping rates at a level which might have to be raised later when the depreciation deduction runs down.

Of course, there are a number of states which have already indicated their willingness to permit companies using accelerated depreciation to "normalize" income taxes for purposes of accounting and rate making. A clearer pattern should emerge on this—as among all of the state commissions—during the year 1959.

P. S. Here's a bonus prediction: Congress will *not* repeal or cut the 10 per cent telephone excise tax in 1959, but neither will it turn such taxes over to the states as proposed.

Iowa-Illinois and NW Bell Exchange Iowa Properties

Telephone exchanges in nine Iowa communities are involved in a change of ownership under an agreement just announced by A. W. Sanders of New London, Ia., vice president and general manager of Iowa-Illinois Telephone Co. and M. F. Oberg of Des Moines, vice president and general manager of Northwestern Bell Telephone Co.

The telephone exchanges serving Bondurant, Grimes, Polk City and Waukee, Ia., now owned by the Iowa-Illinois Telephone Co. would become Northwestern Bell property and the Northwestern Bell exchanges of Fonda, Newell, Rembrandt, Peterson and Wapello would be owned by the Iowa-Illinois Telephone Co.

Following an inventory of property, the transaction would be submitted to the Federal Communications Commission for approval, before the transfer takes place, the announcement said.

Mr. Oberg stated that the Northwestern Bell company desired to serve the four exchanges adjacent to Des Moines because there was a community of interest between each of them and Des Moines and other nearby Northwestern Bell exchanges. Integrated service and management will be of advantage to the customers in the entire service area, he added.

Mr. Sanders pointed out that the Iowa-Illinois company now serves a number of other exchanges in the vicinity of each of those it proposes to acquire and that the addition of the properties would increase the efficiency of management and maintenance for all customers in the territory.

Northwestern Bell now furnishes exchange service in 154 communities throughout Iowa, while the Iowa-Illinois Telephone Co. serves 34, most of them in southeastern Iowa and only Albert City and Marathon in the northwestern part of the state.

When the transfer of ownership is completed Northwestern Bell will proceed with the service modernization program planned by the Iowa-Illinois company for the four exchanges in the Des Moines area, according to Mr. Oberg.

The present service, equipment and operator office arrangements of each of the exchanges the Iowa-Illinois Telephone Co. is acquiring will be continued, Mr. Sanders said.

Propose 3-for-1 Split To AT&T Stockholders

The board of directors of American Telephone & Telegraph Co. initiated action on Dec. 17 to split the stock of the company on a three-for-one basis. The proposed stock split will be submitted to the share owners for vote at the annual meeting to be held on Apr. 15, 1959. It is expected that the additional shares resulting from the split will be distributed about June 1, 1959, and that the first quarterly dividend payment on the split shares will be made in July 1959 at the annual rate of $3.30 per share.

The board believes that the proposed action will make the company's shares attractive to more investors and therefore widen the market for the company's stock. It will strengthen the position of the company in competing for the large amounts of equity capital that will be needed in the future to meet the nation's requirements for telephone service in our expanding economy.

For the past three years the Bell System has spent 2 billion dollars or more per year for new construction. The major part of this has been raised through the sale of securities. Expenditures of this magnitude are expected to continue. This is considerably more than has been spent by any other privately owned corporation. It has furnished employment to many thousands of people and has had a beneficial effect on business conditions throughout the country, the company pointed out.

If the company is to continue these large and important construction programs, a broader market for the company's stock is essential.

SECODE
SELECTIVE CONTROL DEVICES
Reports On...

A Power Company's Private Radio System

Secode selective signaling has paid off handsomely for one of the country's largest power utilities.

The Problem

Every truck in their fleet is radio equipped. Each truck carries a two-man crew. Normally, crews are away from their trucks except while traveling between jobs. Until Secode selective signaling was installed, there was no simple reliable way to call crews working on jobs some distance from the truck.

Many power company trucks still carry an extra man simply to attend the radio . . . an unnecessary expense for fleets equipped with Secode.

In an effort to solve the problem, several types of signaling devices were tried before this company heard about Secode. They were all unsatisfactory because of low code capacity, high maintenance and lack of reliability.

The Solution

When Secode single tone dial-operated digital decoders were installed in the vehicles together with special alarm units for blowing the horn automatically at six second intervals, the problem was solved. All crews can be singly or collectively recalled from the job at will. False and missed calls are a thing of the past.

ADVANTAGES OF SECODE

Only with Secode selective signaling could the user get the most out of his mobile radio system. Only Secode offered system integrity, large code capacity and minimum maintenance at a very nominal cost.

Only Secode offers a system that keeps working when tubes, tuning, and voltages are off peak. Secode equipment meets OCDM (formerly FCDA) specifications for selective signaling gear. Under these specifications, it is eligible for matching funds.

If you would like to learn more about this and the many other applications for Secode selective signaling, call your nearest Secode engineering representative or drop us a note. Please address Dept.7312.

6

SECODE CORPORATION
The new name of
ELECTRICAL COMMUNICATIONS, INC.
555 Minnesota Street, San Francisco
MArket 1-2643

Norwegian Communications Undergo Expansion

By the end of 1962, the Norway Telephone Co., Oslo, expects to have installed an additional 28,000 lines, it was reported on Dec. 4. However, at present approximately 28,000 applicants are waiting for telephones and if demand continues to grow at the current rate, the Oslo company expects, according to the report, that at least 12,000 will still be waiting for service by the end of 1962.

Norsk Telegrafverk, which operates nearly all Norwegian telephone companies, including the one in Oslo, has undergone an expansion since the war. From 1947 through 1956, the number of installed telephones grew from 280,000 to about 550,000, or an increase of nearly 100 per cent.

R. E. Forsythe Retires From Pa. Independent

Ralph E. Forsythe, vice president and general manager of the Peoples Telephone Corp., Butler, Pa., retired on Dec. 1, after 52 years of service.

Mr. Forsythe began his career with the company in 1906 when it was the Peoples Telephone Co. His father, J. Everett Forsythe, was one of the company's founders.

First working in the storeroom and at the repair desk, he later became a station installer.

In 1925, when the Peoples Telephone Corp. was organized, Mr. Forsythe was appointed commercial manager. He held this post until 1949, when he was appointed assistant to the general manager. In 1952, he became assistant to the president, and, since February 1958, he has been general manager.

He became an officer of the company in 1951 when he was appointed secretary, becoming treasurer in 1956, and a vice president in 1958.

Mr. Forsythe will remain a vice president and a member of the board after his retirement.

N. Y., Cal. Companies Register Stock with SEC

Two telephone companies have registered new stock offerings with the Securities & Exchange Commission, it was reported on Dec. 19.

The Rochester Telephone Corp. has filed 195,312 additional shares of common stock to be offered to stockholders at the rate of one new share for each six held.

The offering, to be underwritten by a group managed by First Boston Corp., is expected to start Jan. 9 and run until Jan. 26.

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General Telephone Co. of California, has asked the SEC to register 500,000 shares of 5 per cent cumulative preferred $20 par stock totaling 10 million dollars.

The offering will be handled through Paine, Webber, Jackson & Curtis and Mitchum Jones & Templeton.

The company said proceeds will be added to treasury funds for use in property additions or for the discharge of short-term bank loans incurred for construction expenditures.

Offering their congratulations to retiring Ralph E. Forsythe (center) of the Peoples Telephone Corp., Butler, Pa., on his 52 years of service, are Zeno F. Henninger (left), president, and S. E. Phillips, general manager.

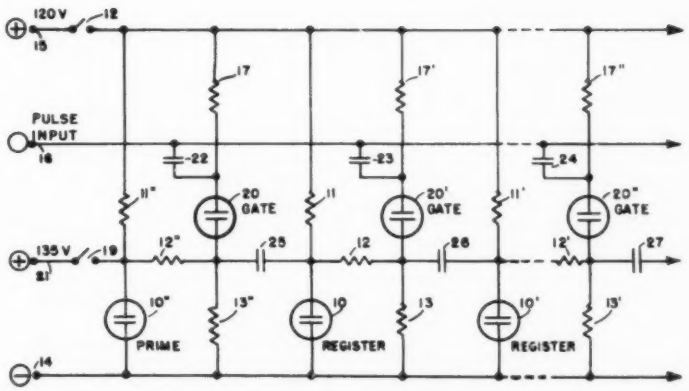
ELECTRONIC SWITCHING

ELECTRONIC switching for telephone lines will have to duplicate with tubes and transistors many of the functions now performed by relays and switches. One of these functions is that of remembering or registering a number dialed. In a step-by-step automatic office, rotary switches move up with dial pulses, and while they remain off-normal constitute a memory or registration of the number. Common control systems like panel and crossbar store the numbers in the form of locked up relays in the sender.

One way this information can be recorded is shown in the accompanying drawing of Patent No. 2,829,309, issued to H. L. Foote and assigned to General Dynamics Corp. A feature of this patent is that it uses inexpensive parts. The tubes shown are simple neon lamps. Those marked 20, 20′ and 20″ can be NE-2's. These lamps have a firing and sustaining requirement of about 75 volts. That is, they will light up and conduct, and remain conducting as long as 75 volts are applied to them.

Those marked 10, 10′ and 10″ can be NE-96's. This type of lamp will not fire and conduct until about 135 volts is applied to it, but once it has been started, it will continue to remain lighted and conducting even though the voltage is reduced to seventy-five.

In the circuit, as shown, closing switch 12 produces no action, because only 120 volts are applied. The circuit is started by closing priming switch 19 momentarily. This puts 135 volts across prime tube 10″, which causes it to conduct. This lamp did not previously conduct, because the 120 volts from switch 12 was detoured around it by resistors 12″ and 13″.



Patent No. 2,829,309

However, once this lamp conducts, it is in parallel with these two resistors, and thus changes the voltage drop across them. Because this lamp will sustain on 75 volts, it remains lighted after the 135 volt pulse is removed. Because of the change in voltage drop across these two resistors, the voltage at their junction, and at the bottom of gate 20 is changed. This puts the gate in a condition to receive the first pulse over lead 16.

This pulse must be more than 15 volts. When it arrives, it surges through C-22. It adds to the voltage already present and thereby fires the lamp 20. Because this lamp has the same firing and sustaining voltage, it will conduct only as long as the pulse lasts. Although this first pulse will also reach gates 20′ and 20″, these lamps will not fire because register lamps 10 and 10′ have not been fired and the right voltage condition for the lamp has not been prepared.

When gate 20 conducts under influence of the pulse, a voltage surge is applied to C-25. This raises the voltage on register 10 long enough for it to fire. Although the voltage drops immediately afterwards, lamp 10 is of the type that will keep going on the lower voltage, once it is started. Once lamp 10 lighted, it does the same thing for gate 20′ that lamp 10″ did for gate 20.

Thus the next pulse will cause gate 20′ and register 10′ to fire. This can be continued for any number of pulses. A number of register lamps will remain lighted which will be the same as the number of pulses received.

All lamps can be extinguished and the circuit reset to normal by momentarily opening switch 12. Typical values for the various elements in the circuit are as follows:

	ohms
Resistors 11, 11′, 11″ =	110,000
Resistors 12, 12′, 12″ =	470,000
Resistors 13, 13′, 13″ =	3,300,000
Resistors 17, 17′, 17″ =	120,000
Capacitors 22, 23, 24 =	.01 mf.
Capacitors 25, 26, 27 =	.005 mf.

TRANSISTOR TESTER

FOR CERTAIN critical applications, transistors have to be pretested before use. This is because transistors often do not have close enough tolerances to suit special needs. This is particularly true in some military applications. In the past, this testing has been done manually, each transistor being subjected to critical tests with an array of expensive instruments. The use of highly skilled personnel has been required and the whole operation has been costly and time consuming.

Stromberg-Carlson has built an automatic transistor tester for the Sperry Gyroscope Co. The machine will apply seven successive tests at a rate up to 430 transistors per hour. Among the tests the machine will make are dc Beta (pulse test); ac Beta (small signal) saturation and leakage. The transistors are tested with an accuracy of ± 2 per cent. The machine handles them in sort of an assembly line fashion. Transistors which fail in any test are ejected at the station at which they fail. Thus the device sorts the rejected transistors according to their defects.

TINY TRANSISTORS

WHEN transistors must handle high frequencies they must be made very small. Of course, any kind of a transistor seems small in comparison to the vacuum tube it can replace, but Bell labs now makes units that are really small. A need for these tiny transistors developed with the building of the satellite, Explorer I, where one was used to provide the 108-megacycle signal that carried information back to earth.

The size of the little transistor, according to *Bell Laboratories Record*, is about the same as an undotted "i" and the thickness about that of a piece of paper. This wafer of germanium must be prepared by placing two metallic stripes on it, one of aluminum and the other of a gold-antimony alloy. These stripes are about .006 x .001 inches, and about 500 atoms thick.

These stripes are placed by an evaporation process—the same technique that causes water vapor to collect on a cool surface. As vapor arises from boiling water, the molecules collide with molecules in the air, and hence take an erratic path. In vaporizing the metals, the heating is done in a vacuum, so the metallic molecules travel in a straight line.

As a result, a small mask can be placed over the germanium wafer and the vaporized metal will go through the aperture of this mask and condense on the wafer. Actually both metals can be deposited through a mask with a single opening. By having the evaporation sources of the two metals located at different points, the metal particles will land on two different parts of the germanium.

After the stripes are deposited, the wafer is heated to a point where some of the stripe material melts into the germanium. When the metal resolidifies, some of the stripe metal, such as the aluminum, enters the germanium as an impurity. It is this process which creates the emitter p-n junction.

Western Electric is now able to process 50 of these transistor units at a time on a single thin slab of germanium less than one-half inch square.

NEW "TWISTOR"

THE TWISTOR is a matrix composed of both magnetic wire and copper wire. It will store electric pulses as magnetic conditions and, hence, might be used as a memory for a computer or an automatic telephone system. The original model developed by Bell Telephone Laboratories was described in the Jan. 25, issue of *Telephony's Electronics Section.*

A further development has now been made and a reversible, diodeless shift register employing a single magnetic wire as the memory element is now under development at the laboratories. Shift registers are

Close-up view of the twistor shift register developed at Bell Telephone Laboratories. The tiny solenoids are wound on a ceramic tube and the magnetic wire is stretched inside the tube.

temporary storage devices and do much the same job as delay lines, except that the stored pulses can be shifted along at will.

The twistor uses the principle that a magnetic material when twisted can be magnetized more easily in a spiral direction and can store pulses when subjected to a magnetizing field. The magnetized zones can be slid along the wire under the control of externally applied advance pulses.

In the experimental model, information bits are written in and slid along by tiny eight-turn solenoids, each 0.075 inch long. These wires are wound on a ceramic tube. The magnetic wire is stretched through the center of the tube.

To read out a signal, a pulse is passed through three special readout coils. If a "bit" is present, a voltage pulse will appear across the magnetic wire. If there is no bit, no voltage pulse appears.

Thus the pulses of information stored in the register may be brought out and used when required.

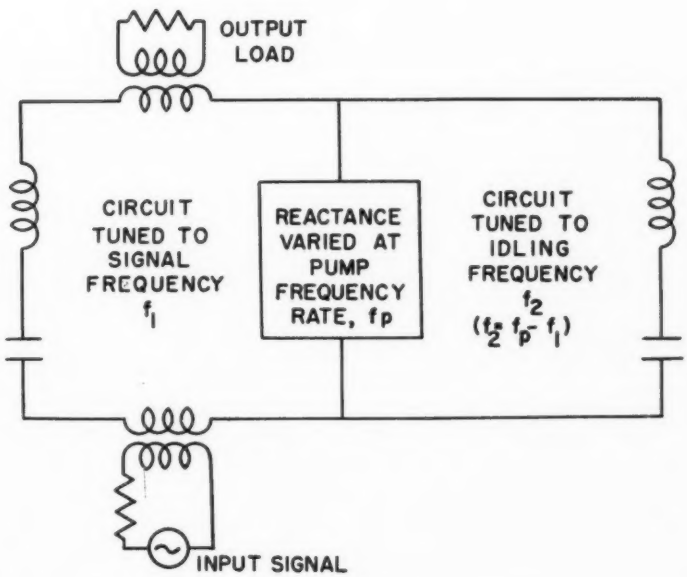
PARAMETRIC AMPLIFIER

ANY electrical conductor has a certain amount of "built-in" noise as a result of the random movement of electrons. Thus, any piece of wire, or resistance, is constantly generating a slight noise voltage across its terminals even though it is not connected to anything. A 100,000-ohm resistor, for instance, develops about 2 or 3 microvolts of noise at room temperature in a frequency band of 5 kc.

The amount of noise is related to the temperature, the resistance and the bandwidth. Hence, any electrical circuit using conductors has noise built right into it before it is even hooked up. Vacuum tubes add a lot more noise due to random movements of the electrons inside.

The level of noise is the limiting factor in communications. To be received and used, a signal must be louder than the noise, or all you hear is the noise. A great deal of engineering effort has gone into overcoming this handicap. One result is the solid state maser described in *Telephony's Electronics Section* for Aug. 30. This device avoids noise by lowering the temperature with liquid helium, and using a technique which does not involve free electrons.

Another development which is exciting the electronics world today is the parametric amplifier. This device uses a solid state device such as a silicon diode or a ferrite material to vary the capacitance or inductance in a circuit. The name parametric is derived from the fact that engineers have given the name "parameter" to the various parts of an electrical circuit. Thus, the inductance and capacitance in a circuit are parameters. The parametric amplifier is so named because it works by virtue of changing parameters.


OUTPUT LOAD
CIRCUIT TUNED TO SIGNAL FREQUENCY f_1
REACTANCE VARIED AT PUMP FREQUENCY RATE, f_p
CIRCUIT TUNED TO IDLING FREQUENCY f_2 ($f_2 = f_p - f_1$)
INPUT SIGNAL

Basic elements of a parametric amplifier (IT&T drawing).

Vacuum tube and transistor amplifiers operate by means of changing resistance. A weak incoming signal on the grid of a tube changes the resistance of the electron flow within. A local source of power, such as a battery, sends current through this varying resistance, and thus produces a more powerful reproduction of the incoming signal.

Amplification can also be achieved by changing the capacitance or inductance in a circuit. Also, two frequencies can be "mixed" or modulated, if the variation is non-linear. This means the variation of the circuit element (resistance, capacitance or inductance) is not directly proportional to the force that causes the variation. This action occurs in telephone carriers, for instance.

(A more complete explanation of this type of circuit behavior is contained in "Electrical Principles Used in Carrier Operation" available for 75 cents from TELEPHONY.)

The parametric amplifier may use a special silicon diode. In addition to being regarded as a semi-conductor, a small amount of capacitance appears across the terminals. This capacitance can be varied in a non-linear manner by an applied voltage. In a parametric amplifier using this principle, both the received signal frequency and a locally generated frequency are mixed in the silicon crystal.

Circuit-wise, this resembles the mixing in a super-heterodyne receiver, but in this case, the received signal picks up energy from and is amplified by the local frequency. This local frequency is called the "pump" frequency. Within the diode the effect is that of creating a negative resistance.

You might think of the action as

using a capacitor, one plate of which can be pumped back and forth, to raise and lower the capacity. Pumping the plate back and forth amounts to adding energy to the circuit, as moving a coil in a magnetic field adds energy (as with a telephone magneto, f'rinstance). The energy thus pumped into the circuit adds to the received signal and hence amplifies. But, alas, for all the newness of the parametric amplifier, the principle is at least 75 years old. Physicists recognized long ago that oscillations could be sustained in a resonant circuit if energy can be drawn from an outside source.

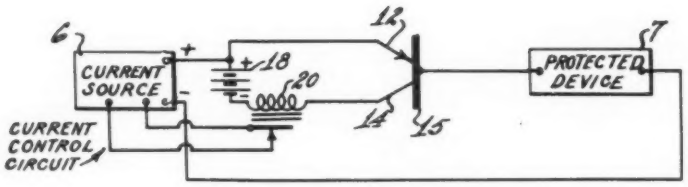
However, the practical use of the parametric amplifier has already been demonstrated. The ITT Laboratories have tried it out on their over-the-horizon radio system. The range of this system has been about 250 miles without repeaters. The parametric amplifier, because of its greatly decreased noise, extends this range to 350 miles.

An experimental model of the amplifier used an input signal frequency, f_i of 900 megacycles. The pump frequency, f_p was 9900 mc. The output, or idling frequency f_2 was 9000 mc. An overall noise figure of 1 db was obtained with a bandwidth of 10 mc.

PROTECTIVE CIRCUIT

ELECTRICAL apparatus is usually protected by fuses or circuit breakers, which will open the circuit if excessive current is drawn. These things work fine when enough current can be tolerated in a circuit to operate the protective device.

A circuit breaker is essentially a relay whose winding is in series with the electrical load. If the load exceeds a certain value, the relay operates and the contacts act to turn off the current supply. Trouble is, there are some sensitive electrical devices which would be damaged if they passed enough current to operate even the most sensitive of relays. A microammeter for example could not be protected by a relay, unless you had a relay which would operate in the micro-ampere range; even so, damage could occur before the relay would operate.



Patent No. 2,841,746.

An additional problem with such protective devices is that they often introduce an undesirable resistance into the circuit. A sensitive relay has high resistance and very small fuses also have measurable resistance.

An approach to this problem is contained in a recently granted patent, No. 2,841,746. This idea uses a junction type transistor between the current source and the protected device. In the accompanying drawing, the circuit can be traced from the positive pole of the current source through the emitter 12 of the transistor, to the base 15, through the protected device 7, and back to the negative pole of the current source. The relay 20, it will be seen, is not in the primary circuit.

If an overload should occur, current will flow from battery 18, through the transistor, into relay 20, causing it to operate. The relay contacts then would act to disconnect the current at its source.

The advantage of this circuit is that the transistor, by virtue of its current amplification, can provide the large amount of current the relay requires for fast operation, without this current going through the protected device. For practical use, the relay 20 would require a latching or locking feature, or a lock-out feature would have to be built into the current source. Otherwise the operation of the relay would remove the current, which would cause the relay to release and reapply the current, thus instituting a buzzer type of action.

The patent was issued to Daniel D. Mawhinney and assigned to the Radio Corp. of America.

FCC RULES INTERPRETED

THE FEDERAL Communications Commission recently revised its rules for the mobile services. This revision included provisions for a Telephone Maintenance Service—a radio system for a telephone company's own vehicles. It also made changes in the frequency assignments for other mobile services.

An interpretation of these rules and how the new assignments will affect different classes of users has been made by one of the mobile radio equipment manufacturers. You can get a free copy of this paper by writing to Harry Copelan, Kaar Engineering Corp., 2995 Middlefield Rd., Palo Alto, Cal. Ask for "FCC Rules & Regulations—An Interpretation."

MICROWAVE CATALOG

A NEW radio and microwave catalog has been issued by the Andrew Corp. This is of interest to any telephone company which now has or plans a radio installation in its plant. The Andrew catalog has a complete listing of antennas, trans-

mission lines and accessories. Shown are parabolas, unipoles, yagis and other types of antennas for radio services from mobile to microwave.

An engineering section makes the catalog especially valuable. This section includes nomographs, charts and equations to help the engineer in his antenna and transmission line problems.

Telephone companies can get this publication by writing to Andrew Corp., 363 E. 75th St., Chicago 19, Ill.

ELECTRONIC VOTING

THE DAY is soon coming when you will not be able to even vote without the help of electrons. Now in the works is a system for electronic voting machines for small precincts.

The system contemplates the use of electronic relaying equipment which would automatically tally the votes as they are cast at some central location, such as the county registrar's office.

At the close of the polls the central recorder would be unlocked and the results of the election read at once.

AUTOMATIC VOLUME CONTROL

TELEPHONE companies which lease circuits for radio broadcasting, wired music systems, or other program service will be interested in an AVC Amplifier which can be placed on such circuits. This special amplifier can function as a limiter to prevent loud sounds from causing cross-talk troubles in the telephone circuits.

In addition, it can be made to work as a compressor or expandor, similar to the equivalent circuits in carrier systems. This amplifier, however, works in the audio range from 20 to 20,000 cycles per second. Electronically the amplifier is a two-stage push-pull circuit. The input is designed to have optimum limiting action with minimum distortion. It will directly match a 600-ohm telephone line. It will maintain a constant output within ± 1 db with input changes of 30 db.

Rapid automatic gain reduction prevents syllable clipping, slow automatic gain increase avoids automatic control at syllabic frequencies.

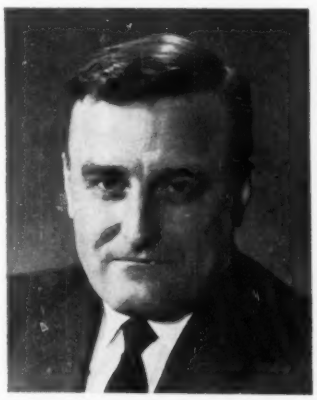
You can get a specification sheet describing this equipment from the Amplifier Corp. of America, 398 Broadway, New York 13, N. Y. Ask for Circular No. 5803.

Advertisement

How To Get Your Money's Worth From Electronic Equipment!

THE TELEPHONE industry is rapidly taking advantage of new developments in electronics. This is only natural. Since the telephone first came into existence, telephone men have been quick to recognize the value of new developments.

Thus it is not surprising that the industry is using more and more electronic equipment. Mobile radio is used to connect telephones in cars, trucks and other vehicles. Microwave relay links are used in place of wire and cable in many places. Electronic carrier



Carl E. Smith, E. E., President Cleveland Institute of Radio Electronics

circuits and repeaters result in better utilization of existing (and proposed) facilities.

All of these improvements are available today. Tomorrow will see even greater advances. The manufacturers of telephone equipment can be relied upon to give you the kind of equipment you need to fulfill your obligations to your subscribers.

However, you should keep in mind a fundamental principle of management . . . a chain is only as strong as its weakest link. Thus, no matter how big or small you may be, your equipment will not give maximum performance unless it is maintained by competent technicians.

Every company has a technical staff. It may consist of hundreds or perhaps thousands of men . . . or there may be only two or three. These men know and understand telephone technology as it used to be, but in all honesty, do they understand the fundamentals of electronic circuitry?

If they aren't on speaking terms with oscillators . . . rectifiers . . . amplifiers . . . transistors . . . etc., they are not going to be able to give you the technical support you need. A man may be able to wire a central office switchboard in the dark, but if he isn't skilled in the mental tools of electronics, your new equipment will not give you the service you paid for.

In all probability your present staff is very capable. You wouldn't have one which didn't give you the reliability you must have. Therefore they are the logical men to take on the maintenance of electronic equipment . . . as soon as they have received a sound foundation of electronic fundamentals.

This can be done economically and without the loss of valuable man hours by a non-resident training program. Several schools offer this service. They teach your men the fundamentals of electronic circuits. Then, with the ability to understand the principles of any electronic device, your company and the equipment manufacturer have only to conduct a brief orientation of the specialized equipment.

This plan has been used successfully by many companies. It has helped them . . . and it can help you. It will pay you to investigate and get the facts.

For full information on schools providing training in electronic theory and FCC license preparation, write to the National Home Study Council, 1420 New York Avenue, N. W., Washington 5, D. C.

If you would like the details on a "guaranteed" Employers Plan for training technical personnel, write to

THE REGISTRAR
CLEVELAND INSTITUTE OF RADIO ELECTRONICS
4900 EUCLID AVENUE, DESK TE-27
CLEVELAND 3, OHIO

Minn. Independent Offers Dial Mobile Service

The Federated Telephone Cooperative of Chokio, Minn., which operates automatic telephone exchanges in Chokio, Alberta, Odessa, Correll, Holloway, and Danvers, on Dec. 5 announced a new integrated dial mobile radio-telephone service.

The new integrated service is a novel type of mobile telephone service, in that it is integrated with an automatic switchboard and will provide mobile telephone service within the base station area without the services of a mobile telephone operator.

The integrated dial mobile radio telephone system being established by the Federated Cooperative, is the first of this type of service to be installed in the state of Minnesota and is one of about 20 systems that are in the process of development by telephone companies.

The system being installed by the cooperative will be operated from a 300-foot radio tower and base radio station located 5½ miles north of Holloway, Minn., and will be directly connected to the Holloway switchboard. The base radio station will provide radio-telephone service within about a 40-mile radius of the tower. The radio base station and mobile equipment is licensed to the Federated cooperative by the Federal Communications Commission and will operate on 152.63 and 157.89 Mc frequencies respectively.

Tariffs for charges for the services have been filed and approved by the Minnesota Railroad & Warehouse Commission. The service will be available to prospective users served by other companies by applying to their local telephone companies. Agreements will then be made between their telephone companies and Federated cooperative for the service.

Federated Telephone Cooperative will use the service in the maintenance of its telephone system and will also provide the mobile telephone service requirements for the Agra Lite Cooperative of Benson, and the Swift Co-op Oil of Benson. It is believed that there will be a considerable number of others that will find it profitable to subscribe to the service. The service as such, is not intended to compete with existing telephone services, but is to be used to render telephone services not now available.

The equipment which includes tower, base station building, base station radio transmitter, standby power generator, mobile radio units, and fixed radio units is being constructed, supplied and installed by Motorola Communications & Electronics, Inc. Construction of the radio tower was started in the week of Dec. 8 and the system is expected to be in operation during the month of January.

The mobile units will be of the latest type of equipment available and will use push buttons instead of the normal telephone dial. The pushing of these buttons in the proper sequence "dials" the exchange or party desired. Each button produces a combination of tones which are transmitted to the terminal base station. Tones are converted to standard dialing pulses and are fed to the automatic switchboard exchange which completes the call to a land subscriber's telephone, or to a toll operator, if a long distance call is being made. In calls between two radio-telephone stations, the base station is used as a repeater in retransmitting the messages.

L. E. Armfield of Communications Consultants, Inc., Fargo, N.D., is the project engineer and made the necessary studies and engineering for the project. The cooperative and Mr. Armfield, in the development and co-ordination of the project, had the full cooperation and assistance of J. Ward Wray of REA, Keith W. Vogt, secretary of the Minnesota Telephone Association, Daniel W. Carr, telephone supervisor of the Minnesota Railroad & Warehouse Commission, Bruce D. Morton, Independent company relations coordinator of Northwestern Bell Telephone Co., and John L. Henrichsen of the Pioneer Telephone Co. of Waconia, Minn.

The manager of Federated Telephone Cooperative, Willard Anderson, has been serving as chairman of a Minnesota Telephone Association Integrated Mobile Radio Telephone Committee and as a member of the National Telephone Cooperative Association (region six) Integrated Mobile Radio Telephone Committee. These committees were formed for the purpose of co-ordinating the efforts of telephone companies in the development of mobile telephone systems in regard to tariffs and participating agreements.

REA Advisory Group Calls Excise Tax Discriminatory

The telephone advisory committee to the administrator of the Rural Electrification Administration, following its Nov. 24-25 meeting in Washington, D.C., stated that as a result of its examination of the REA program to date, it is of the opinion that "very substantial progress is being, and continues to be made."

The committee also feels that the intent of the telephone amendment to the Rural Electrification Act, as enacted by Congress, is being carried out. The administrator and his staff are to be complimented for the manner in which the Act is being administered, the committee stated.

It was the consensus of the committee that the excise tax is a discriminatory burden on the telephone user, and that it is continuing to have a detrimental effect on the rural telephone program.

The committee feels that efforts must be continued to get the various states to pass enabling legislation to participate in the Federal-Aid Highway Program, as passed by Congress, with relation to relocation of utilities facilities.

The following recommendations were submitted by the committee:

(1) *Joint use of pole facilities.* We endorse the continued joint-use of facilities, and recommend that REA encourage, investigate and promote more joint-use of facilities within the rural electrification industry.

A wider application of joint-use construction, at a reasonable rate, will enable telephone borrowers to provide modern, dial telephone service to a greater number of people.

(2) *Research and training program.* The committee recommends that REA continue its fine work, in cooperation with the industry, in the development of new equipment and methods for the purpose of providing not only initial service, but improved service, to people in rural areas.

We further recommend that REA continue to hold necessary training programs to help promote and expedite rural telephony.

(3) *Survey of program potential.* The committee concurs in the efforts being made by REA to develop this survey. We realize it is a large job and recognize the progress that is being made.

(4) *Appointment of loan application committee.* The committee is of the opinion that there should be a reappraisement of loan application procedures for the purpose of determining whether they can be shortened in order to speed up processing, particularly in regard to supplemental loans. A subcommittee was appointed to handle this.

(5) *Appointment of engineering committee.* It was also the opinion of the committee that the engineering service contract be reviewed.

The purpose of this review is to determine methods of streamlining the contract to eliminate duplication of effort and to define areas of responsibility in order to obtain a reduction in the cost of over-all engineering services.

The committee devoted considerable discussion to the potential growth of the rural telephone program throughout the country, and to the need for improving existing plant. The telephone loan program was authorized by Congress, and the telephone advisory committee stated it feels that adequate funds should continue to be made available to ensure the success of this necessary and vital program.

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Rider Books to Appear In Foreign Languages

Announcement has been received from John F. Rider, president of John F. Rider Publisher, Inc., that contracts have been signed for the translation of a number of titles in the Rider line into several foreign languages and publication in the respective countries.

A West Germany publisher of long standing has purchased the rights to translate into German and publish in Germany the Rider Electronic Technology Series, edited by A. Schure, Ph.D., Ed.D.

The first six titles to appear are: "F-M Limiters & Detectors," "Crystal Oscillators," "R-F Transmission Lines," "Antennas" and "Vacuum Tube Rectifiers." Subsequent titles will appear in blocks of six at a time.

"How To Install TV Antennas," another Rider title, authored by Samuel L. Marshall, will be translated into Italian and published in that language by a publisher in Bologna.

The Spanish language rights to "Repairing Television Receivers," by Cyrus Glickstein, have been sold to a publisher in Buenos Aires.

Spanish language rights to five other Rider titles have been acquired by a publisher in Mexico City. Among these are: "High Fidelity Simplified," by Harold D. Weller, and "How to Read Schematic Diagrams," by David Mark, both of which, Rider reports, have been outstanding sellers among technical books in the United States.

A publisher in Rio de Janeiro has signed contracts to publish six Rider books in Portuguese for use as school texts. Among these are: "Fundamentals of Transistors" (2nd edition), by Leonard Krugman, which, Rider states, has been an extremely successful book in English; "Repairing Television Receivers," by Cyrus Glickstein; "How to Use Meters," by John F. Rider; "How to Use Signal & Sweep Generators," by J. Richard Johnson; "How to Install TV Antennas," by Samuel L. Marshall, and one other.

Copies of any of the books mentioned above may be purchased through TELEPHONY. Orders must be accompanied with remittance in U. S. currency. Books will not be sent on open account.

Barber Replaces Gritten As Oregon Secretary-Treasurer

Harley J. Barber of Beaverton, Ore., has been appointed secretary-treasurer of the Oregon Independent Telephone Association, effective Jan. 1, replacing L. A. Gritten who has resigned after holding that position for over 20 years.

Mr. Barber has served West Coast Telephone Co., Everett, Wash., and its predecessor company in executive positions since 1918. In partnership with Gaylord E. Baker, he owned and operated the Coast Telephone Co., with six exchanges in Oregon, from 1948 until its acquisition by the Pioneer Telephone Corp. in 1951. Mr. Barber is at present plant office supervisor in the West Coast Telephone Co.'s Beaverton office.

L. A. GRITTEN

H. J. BARBER

Mr. Gritten's resignation as secretary-treasurer of the Oregon association coincides with his retirement from the West Coast Telephone Co. after more than 36 years of service.

Adds Up

Total time lost from work accidents is about 230 million man-days—equal to the year-long shutdown of a plant employing nearly a million workers.

Steady Increase In Number Of Farm Telephones

In 1957, there were 2,684,000 farms in the United States with telephone service, according to the U.S. Department of Agriculture.

This represents an increase of 70 per cent since 1940, 24 per cent since 1950, and 6 per cent since 1955. Nearly all states showed increases from 1940 to 1957.

Recently, in a few states where a high percentage of the farms have telephones, the number of farms with telephones has been declining, reflecting a general decline in the number of farms.

Since 1940, the largest percentage increase in farms with telephones has occurred in the south Atlantic division, followed by the east south central, west south central, mountain, and Pacific divisions. These areas led the percentage increase largely because a relatively low percentage of their farms had telephone service in 1940 as compared with other areas.

The mid-Atlantic and north central states also made substantial gains in the number of farms with telephones. However, their percentage gains were relatively small because about two out of every five farms in the states from New York to Kansas already had telephones in 1940. In the south, less than one out of ten farms had them in 1940.

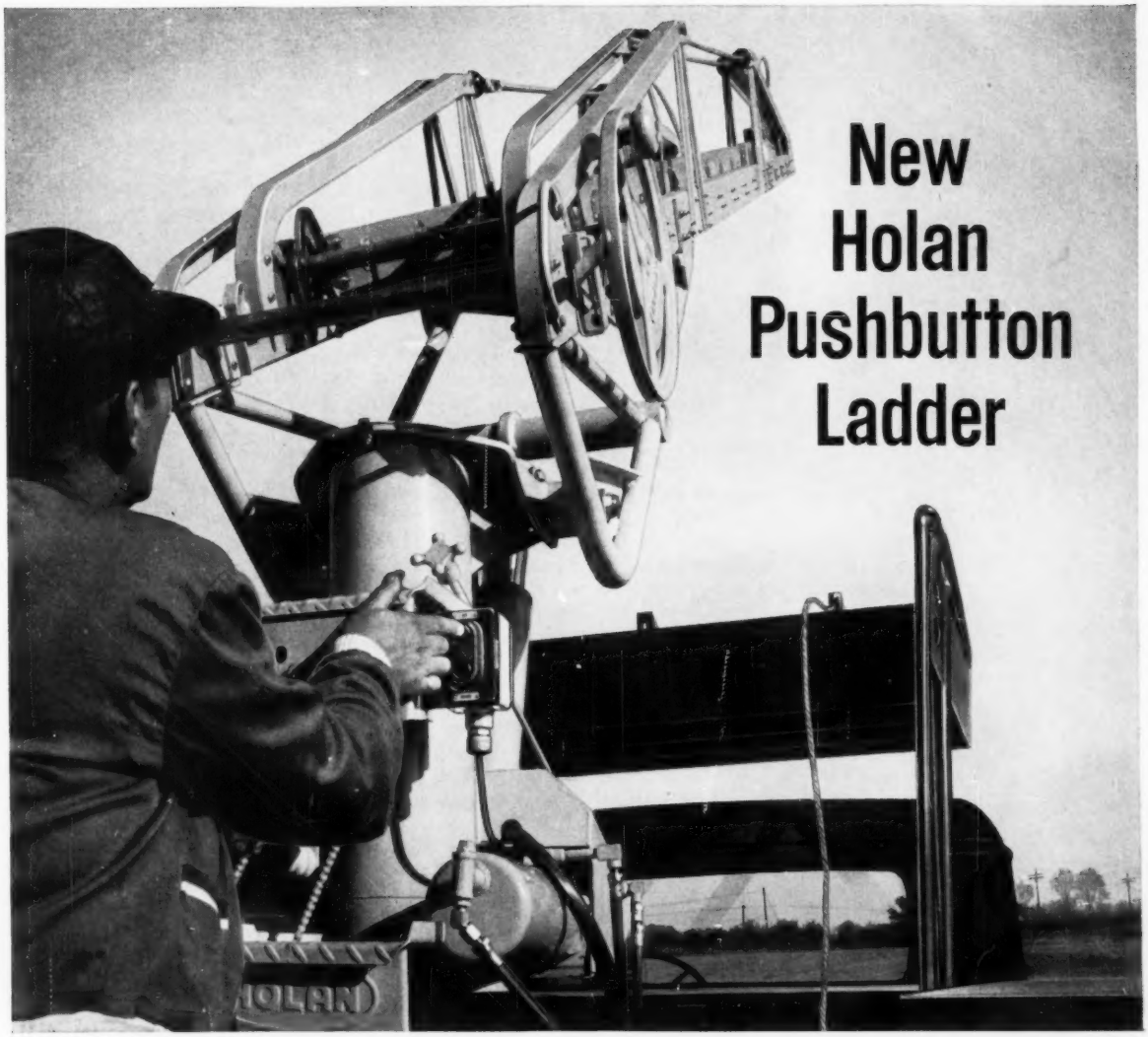
New England was the only area where an actual decrease in number of farms with telephones has taken place since 1940; this resulted from the decline in number of farms.

Leading the states in percentage increase from 1940 was Louisiana; it was also among the top 10 in the actual increase in number of farms with telephones. Texas, which had the largest number of farms of any state in 1940, showed the largest number of farms obtaining telephones since that date.

As the percentage of farms with telephones approaches 100, there will be a decline in the actual number of farms with telephones, because of the present downward trend in the total number of farms. This has taken place already in New England, New York, and Ohio.

Eliminate Backache

Aching backs from lifting can be prevented by observing these National Safety Council tips: Bend knees and squat close to the load, rather than bending from hips with the legs straight. Keep back as erect as possible. Get a good grip on the object being lifted, and lift by straightening legs steadily.



Available with pushbutton platform controls, too

Push a button and the new Holan Series 2600 Ladder goes up; push another button and it comes down. The pushbutton station is on the mast—and a station can be installed on the upper side rail for the man on the platform.

Pushbutton control is just one operating feature. For precise spotting, you have a needle valve with a long handle that enables you to accurately guide the ladder down. You rotate with a crank located directly behind the ladder; this provides a better view for spotting, avoids left-hand cranking and gives maximum clearance between body wall and ladder. And, you crank the fly ladder out *and in* with a windlass.

Important non-operating features include: light-but-strong tubular support frame; heavy duty ladder hooks that engage two rungs at a time; optional protective fiberglass covering on side rails; and optional metal rungs. Heights to 32 feet, 360° rotation, 72° elevation.

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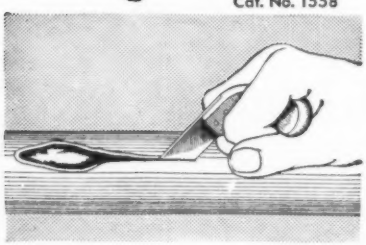

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Handle of cast aluminum, light in weight and with convenient grip; knife of tempered tool steel may be sharpened and is easily removed for replacement. This tool slits insulation from a few inches to as many feet as desired swiftly and simply. Does not damage conductors inside weatherproof sheath.

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Make Yours a Happy New Year

By MAYME WORKMAN

SOON WE shall embark upon a brand New Year. As each new year rolls around, we look forward with anticipation to what it may hold in store for us. We greet our friends with a cheery "Happy New Year," with a hope that the new year will be kind to them.

For many of us, the past year was filled with pleasure, peace, and contentment, while for others it held many sorrows, heartaches, and disappointments.

To a great extent, "Life is what we make of it." In the olden days, people made many New Year's resolutions and, while some were frequently broken within a short time, there is a great deal of merit in having an objective, something towards which to work.

The New Year is also inventory time. Merchants make a record of goods on hand, and try to dispose of the stock left over from the holidays and the previous year. Taking stock enables the merchant to know what goods to purchase for the coming year. He will know from the past year's experience which merchandise moved readily and vice versa.

It is also a good time for individuals to "take stock" of the previous year. What did they accomplish—in friendships, their work, their church, plans for the future, and all of the things that are important in life?

As a New Year dawns, it is well to remember that time is of the essence. As each day passes, it is completely finished—it will never return. Any plans made for the day, not accomplished, must be carried forward to another day.

A New Year is like a new garment—fresh, clean, unsullied—no spots or stains to mar its beauty. Will we keep it that way?

Because each person is an individual, plans for the New Year must be made on an individual basis. Like the merchant, in taking inventory for the past year, we shall learn what was good and what was bad, and we are in a position to make changes and corrections which will result in a better year in 1959.

The New Year comes at a time when the wonderful spirit of Christmas is still in the air. The following poem expresses it so aptly:

AFTER CHRISTMAS

After the carols have faded,
And the gifts have been tucked away
And the candles are stubs of formless wax,
And the snow has moldered to gray . . .
After the holly withers,
And the berries are rusted brown,
And the carpets sparkle with tinseled fir
Where needles came tumbling down . . .
After the dream has ended,
And the embers are burning low,
May the Christ, the Heart of Christmas,
Still brighten the afterglow.

It is the writer's earnest wish that as the old year ends, and the new year begins, you may have peace in your hearts; and that those you love and those you may help may have peace and joy in the New Year. May your busy work days be filled with satisfaction in a job well done, and may your leisure hours be happy and satisfying.

Happy New Year!

Install GRACE In England

The opening of subscriber trunk dialing at Bristol, reported on Dec. 1, brings into service in Great Britain, the first installation of GRACE (Group Routing and Charging Equipment). This automatic apparatus takes over the functions of the operator in setting up trunk calls. It notes the number required, selects the correct route to that number, and charges for the call at the appropriate rate.

Kellogg Names Plant Head For C.O. Equipment

Douglas M. Anderson has been named director of manufacturing for central office telephone equipment for Kellogg Switchboard & Supply Co., communications division of International Telephone & Telegraph Corp.

D. M. ANDERSON

His appointment was announced by Geo. T. Scharffenberger, Kellogg president. Mr. Anderson was formerly manager of switching for Kellogg facilities in Clifton, N. J.

Mr. Anderson has been with Kellogg since 1955. He was previously vice president of manufacturing with Charlton Co., Fitchburg, Mass.; chief industrial engineer with Hayward-Schuster, East Douglas, Mass.; and senior associate with Bruce Payne, Westport, Conn.

A native of Montclair, N. J., Mr. Anderson received bachelor of arts and master of business administration degrees from Harvard University. He served as a lieutenant in the Aleutians area with the U. S. Navy in World War II.

S-C Names San Diego, Radio Lab, Managers

Donald G. Wilson has been appointed general manager of Stromberg-Carlson —San Diego, according to an announcement by George A. Peck, vice president and general manager of Stromberg-Carlson's electronics division, and Dr. Royal Weller, vice president in charge of engineering.

Dr. Wilson will leave his present duties as associate director of research and advanced development in January to head the San Diego office.

In his new position, Dr. Wilson will succeed Harold P. Field, who recently

PUT 'EM DOWN BY MACHINE
to cut anchoring costs!

Many utilities have found that anchor installation time and costs can be cut to the minimum by installing Chance Screw Anchors with their hole boring machines. They use the Chance "Blackfoot" because its special features—correct blade pitch, small hub, large thimbleye—were designed for use with boring machines. These features also mean greater holding power and easier installation of these anchors when they are screwed down by hand.

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–Smaller hub means less earth disturbed during installation. Adds to holding power.

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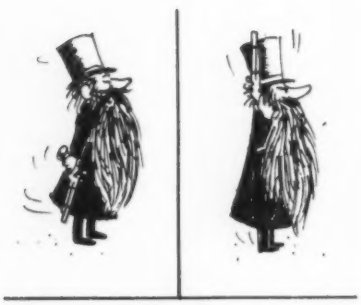

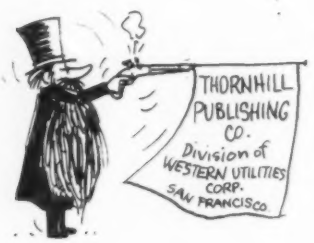

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DR. D. G. WILSON

was named director of marketing of the electronics division.

Stromberg-Carlson's two San Diego plants produce "Charactron" shaped beam tubes used in air traffic control and data handling systems, S-C 5,000 high speed electronic printers, and other electronic equipment.

Dr. Wilson, who joined Stromberg-Carlson in 1955 as associate director of research and advanced development, is a native of Bridgeport, Conn., and a graduate of Rensselaer Polytechnic Institute. He later attended Harvard University where he earned an M. S. degree in communications, and M. E. S. and Ph.D. degrees in applied physics.

From 1939 to 1940, he was employed by the Automatic Fire Alarm Division of the Sealand Corp., Bridgeport, Conn. Subsequently he became an instructor in electrical engineering at Rensselaer. In 1945, he joined the staff of the Massachusetts Institute of Technology Radiation Laboratory, a position he held until beginning graduate study at Harvard.

From 1947 to 1955, he was a professor of electrical engineering at the University of Kansas, and from 1948 to 1955 was chairman of the department of electrical engineering.

In 1953-54 he was on leave from the University of Kansas as a consultant with the Aviation Ordnance Department of the U. S. Naval Ordnance Test Station at China Lake, Cal.

Dr. Wilson is chairman of the national technical committee on electronics and a member of the science and electronics division of the American Institute of Electrical Engineers and serves as a member on various other AIEE committees. He also is a senior member of the Institute of Radio Engineers.

He is a member of the American Ordnance Association, and serves on its guidance and control committee of the guided missile and rocket division. He also is the Stromberg-Carlson representative to the American Society for Engineering Education.

Dr. Wilson is a fellow of the American Association for the Advancement of Science. He is a member of Tau Beta Pi, Eta Kappa Nu and Sigma Xi honor societies and the National Society of Professional Engineers.

He holds professional engineering licenses in the states of New York and Connecticut, and is listed in Who's Who in Engineering, and American Men of Science.

•

Also at Stromberg, George A. Franco has been named manager of the Radio Communication Laboratory in Stromberg-Carlson's research and advanced development division. The appointment was announced by Lynn C. Holmes, director of the division.

G. A. FRANCO

A native of Phillipsburg, N. J., Mr. Franco is a graduate of Lehigh University, where he earned a bachelor of science degree in electrical engineering. During World War II, he served as a radio operator and gunner in the U. S. Air Force in the European Theater, attaining the rank of technical sergeant. He re-entered military service in 1950 as a first lieutenant in the U. S. Army, and served for two years in Korea.

Mr. Franco joined Stromberg-Carlson's research and advanced development division in August, 1956. Previously, he was affiliated with the Bethlehem Steel Co. in Bethleham, Pa., and the General Electric Co. in Syracuse.

He is a member of the Institute of Radio Engineers, and the American Radio Relay League.

The silver anniversary of organized meetings of the nation's telephone equipment manufacturers was held recently in the board room of Automatic Electric Co.'s Northlake, Ill. headquarters. The occasion was the annual meeting of the Telephone Equipment Section of the National Electrical Manufacturers Association. Present at the meeting were (left to right): John Brown Cook, president, Reliable Electric Co.; Stimpson Hubbard, commercial relations manager, Telephone Sales Division, Western Electric Co., Inc.; Harold C. Ripley, executive vice president, Reliable Electric Co.; John H. Voss, vice president and general manager, Tele-communications Division, Stromberg-Carlson Co., a division of General Dynamics Corp.; William F. Boyd, vice president and director of operations, Kellogg Switchboard & Supply Company, a division of International Telephone & Telegraph Corp.; Herbert F. Lello, president, Automatic Electric Co.; Arthur F. Gibson, secretary, Stromberg-Carlson Co.; Clifford W. Smith, sales manager, Telephone Sales Division, Western Electric Co., Inc.; Don Benson, staff secretary, National Electrical Manufacturers Association; William P. Hollis, vice president and director of planning, Kellogg Switchboard & Supply Co.; Leon M. Wells, president, Leich Electric Co., and Willard J. Reid, vice president and general manager, Leich Electric Co. Mr. Gibson was elected chairman of the Section for 1959, succeeding Mr. Lello.

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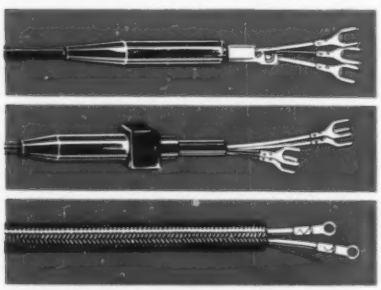

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Whitney Blake Appoints Omans NW Representative

Dean C. Omans has been appointed field sales representative for the Whitney Blake Co., New Haven Wire and cable manufacturer. Mr. Omans will replace J. L. Hodges in the territory

D. C. OMANS

which includes Minnesota, North and South Dakota, western Wisconsin and eastern Montana. Mr. Hodges was transferred to Kansas City on September 1.

Mr. Omans was born in Frazee, Minn. He received his schooling in Iowa, then moved to the Pacific Northwest in 1935 to locate in the Willamette Valley, Ore. Mr. Omans formerly sold Whitney Blake products when representing the North Electric Co., Salem, Oregon.

Cook Electric Appoints Washington, D. C. Manager

Willard D. Myers, recently appointed manager of the Washington, D. C. office of the Cook Electric Co., was formerly an electronics consultant with Clark, Dodge & Co., Wall Street.

With a background of over 30 years in engineering, Mr. Myers has held such positions as regional sales engineer, European communications consultant and midwest regional manager —Philco Corp.; chief engineer—Schine Chain Theatres, Inc.; and vice president —The Strong Electric Co. He also served on the U. S. Navy technical mission to Europe; with the Royal Air Force (London, England) as assistant to chief engineer, and with the Automatic Signal and Sign Co. as general manager.

A member of the Institute of Radio Engineers for 28 years, Mr. Myers is also a member of the American Management Association, American Rocket Society, Society of Motion Pictures & Television Engineers and the Armed Forces Communications & Electronics Association.

York-Hoover Announces Body-Division Appointments

Charles I. Ziegler, president, York-Hoover Corp., York, Pa., on Dec. 10 announced the following body division appointments, effective immediately:

D. H. GROFT

Donald H. Groft, former chief sales engineer of the company, has been promoted to sales manager of the body division.

Mr. Groft is an engineering graduate of the University of Michigan. Prior to becoming associated with York-Hoover in 1945, he was senior project engineer for Chrysler Corp., Dodge Chi-

C. B. STRATTON

cago division. He is a member of the Society of Automotive Engineers.

Charles B. Stratton, registered professional engineer, and engineering

graduate of the University of Pennsylvania, is the new plant manager.

Mr. Stratton, prior to his association with York-Hoover, was employed by Day & Zimmerman Co., Philadelphia

W. E. CICCARELLI

engineering company, where he served as consultant engineer for plant layout and establishment of manufacturing controls. He also performed organizational studies and industrial engineering analyses.

William E. Ciccarelli, who became associated with the body division in 1956, has been appointed chief engineer in charge of design and methods, research and development.

Mr. Ciccarelli is a graduate engineer from Penn State University. He was formerly associated with the ITE Co., Philadelphia, in the capacity of chief, research and development. He is a member of the Society of Automotive Engineers.

Report Sale to 2 Companies

H. M. Yoder, secretary-treasurer of the Springs Mutual Telephone Co., Grantsville, Md., recently announced that his company intends to apply to the Maryland Public Service Commission for permission to sell its Grantsville, Md. exchange to the Chesapeake & Potomac Telephone Co. of Maryland; also to the Pennsylvania Public Utility Commission for authority to sell its Springs, Pa., exchange to the General Telephone Co. of Pennsylvania. The Springs Mutual Telephone Co. has been in existence since 1897.

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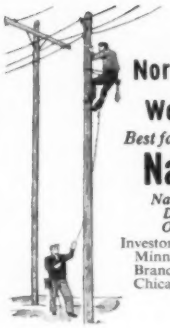

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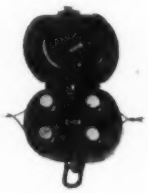

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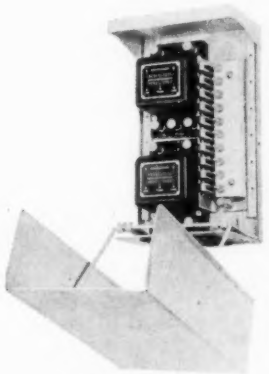

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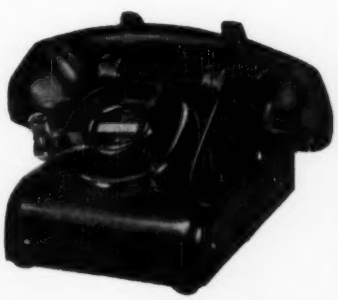

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